



FRIDAY, SEPTEMBER 29, 1899.

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Contributions.

Wheel Concentrations and Railroad Bridges.

New York, Sept. 25, 1899.

To the Editor of the Railroad Gazette:

In Mr. Breithaupt's discussion of "Wheel Concentrations for Railroad Bridges," published in your issue of September 22d, he gives two types of engine distribution, dated 1878 and 1899, respectively, and notes that the ratio of increase is almost uniform throughout. He apparently overlooks the concentration on the forward pony wheel, which scarcely exceeds one ton, in the heavier engines, and is about one-tenth of what is often specified for engines of this weight. This modification would alter entirely the relation of shears to moments, for any given span, and would be a typical illustration of the error of the usual wheel concentrations.

To cite, however, that two diagrams are in the same ratio, does not demonstrate that the engines of the respective dates bear the same relation. The latter diagram might be increased from the earlier one, instead of taken from a recent engine.

It would be interesting to have the concentrations of the actual engine from which the diagram of 1899 is taken and the specification in which it is used.

The question is not whether the equivalent uniform load with a single concentration will give strains the same as the typical diagram, but rather, whether it will not approximate as closely to actual loads as will the diagrams specified. This can only be answered after exhaustive investigation.

HENRY B. SEAMAN.

Suburban Roads and Franchise Fares.

Detroit, Mich., Sept. 22, 1899.

To the Editor of the Railroad Gazette:

A decision has been recently rendered by the Supreme Court of Michigan that will have a very important bearing on franchises already granted to suburban roads in Michigan, and those to be granted in the future. It may also be of great importance to suburban roads in other States, as the decision will undoubtedly be used as a precedent.

The township of Canton (between Detroit and Ypsilanti) granted a franchise to certain people, which was afterwards transferred over to the Detroit, Ypsilanti & Ann Arbor Railway (Electric). This franchise gave the railroad the right to charge 2 cents a mile for any and all distance passengers carried outside of the township of Canton, provided, the railroad would carry them for 5 cents through Canton township. The township of Nankin, adjoining on the east, gave a similar franchise.

Under the Canton franchise a resident of the township would be required to pay 5 cents for his fare through any portion of the township, and 2 cents a mile from the east line of the township to Detroit, a distance of 21 miles, making the through fare 5 cents plus 42 cents, or 47 cents. The steam railroad fare from the station usually used by the residents of Canton is 72 cents.

The suburban road undertook to enforce the provisions of the franchise, so far as charging 47 cents is concerned, but made a cash fare from Canton to Detroit of 35 cents and a mileage book rate of 25 cents. The Supreme Court holds now that a passenger is entitled to ride through Canton for the 5 cents mentioned in the franchise, but that after he has reached the town line, he is not bound to carry

out the other provision of the franchise, in consideration of which he was granted the 5 cents fare, but can take advantage of the Nankin franchise and pay 5 cents through that town, instead of the 2 cents a mile, which would amount to 14 cents through the township of Nankin, and so on to Detroit, tendering in each case, the minimum fare mentioned in the different franchises. The application of this rule will in future entirely prevent the granting of low local fares to residents of townships. It would seem that it will not be safe for any suburban roads to make any concessions to different townships in the way of fare, no matter what the townships agreed to pay for riding beyond the limits of the town, as under this ruling all through fares will be made up of the sum of the lowest local fares.

In the case of the road in question, it will make very little difference, as it runs through a corner of Van Buren township for a distance of about a mile and has under the ruling the right to charge 5 cents for this mile. It also runs through a part of Ypsilanti township, east of the city of Ypsilanti, and has the right to charge 10 cents through this portion of Ypsilanti township. It also has the right to charge 5 cents in the city of Ypsilanti, so that the through fares will not be affected in this particular case by the decision. It will, however, be necessary to take advantage of the high fare through Ypsilanti township and Van Buren township and make the people of Canton pay 25 cents to get from Canton township to Ypsilanti, as against the cash fare of 20 cents and the mileage fare of 10 cents.

It will now be in order for suburban roads throughout the country to look through their franchises in the different townships in the way of fares, as well as other people expecting to build suburban roads to avoid such complications by keeping the local fares high, or as in this case, run their line so as to strike corners of as many townships as possible.

FRANCHISE.

Gasoline Engines for Water Stations.

Port Arthur Route, Kansas City, Mo., August 28, 1899.

To the Editor of the Railroad Gazette:

In 1894 considerable attention was given to the subject of irrigation in the arid and semi-arid portions of our country, and at that time I was managing the business of Fairbanks, Morse & Co., at this point, and gave considerable attention to the question of pumping water; therefore, I still have a great interest in whatever is published with regard to the application of gasoline engines to the pumping of water, in that I was among the first to advocate the use of these engines for this purpose.

In my present position I have given considerable thought and attention to this question, but have found my desire to employ gasoline engines in this service checkmated by the item of expense involved in the first cost of suitable gasoline engines and pumps for the purpose. The prohibitory prices obtain more in connection with the pumps than with the engines, in that there are several good engines on the market to-day which can be purchased at a fairly reasonable figure, but so far no manufacturer seems to have produced a pump which can be bought at other than what seem to me exorbitant prices.

There are isolated locations where it is possible to have the agent or operator also serve as pumper where the water stations are at the station proper, and in such instances through the saving of a pumper's wages, the price on the gasoline combination does not cut quite so much ice as in the numerous locations where you must still retain the services of a pumper.

In the majority of instances the total vertical head does not exceed 100 feet or equal to 43.4 pounds pressure per square inch, exclusive of the item of friction, but if the discharge pipes are properly proportioned to the service to be performed there need not be much added to the actual pressure to overcome the element of friction; therefore, it seems to me a comparatively easy problem for manufacturers to bring out some form of pump applicable to gasoline engine power and which will enable more universal application of this principle to our railroad water stations.

During the period in which I was connected with Fairbanks, Morse & Co., I had on our salesroom floor a small gasoline engine belted to a centrifugal pump, and I have shown them to a great many railroad men, illustrating the facility with which a pumper began operations, completed his work, closed down the plant, and moved on to the next station.

This is one of the great features in favor of the gasoline combination, namely, the facility with which you can begin delivering water into the tank and the ease with which you can close the pumping plant after the tank is filled. In the combination of the boiler and steam pump, especially in the colder weather, from an hour to two hours' time of the pumper is consumed in getting ready to deliver the water into the tank, whereas with a gasoline combination properly proportioned the pump has in that same length of time delivered into the tank anywhere from 10,000 to 20,000 gallons of water.

In the article published in yours of July 28, con-

cerning a test of a gasoline engine at the University of Illinois, I note that in the first test given under date of May 30, 1899, the indicated horse power is 3.63, whereas the theoretical horse power is given as .742. According to my figures there is a slight error in the last mentioned horse power.

From considerable experience in selling gasoline engines and pumps where I was called upon to guarantee the performance of the apparatus I recommended, I found that by multiplying the maximum gallons of water to be discharged per minute by the total feet vertical head (which includes the total vertical distance from the top of the source of supply to the top of the discharge, always figuring that the discharge pipe is continued to the top of the water) and dividing this sum by 1,500 I had the actual horse power of the gasoline engine needed to perform the work. In this constant of 1,500 allowance of 165 per cent. is made for friction.

If this article should come under the eye of some pump maker who is producing a suitable pump for use in connection with a gasoline engine, where a pump of reasonable capacity does not cost more than a steam pump and boiler of the same capacity, I should be glad to receive catalogue from such manufacturers, with quotations of their product.

IRA C. HUBBELL.

The Soudan Railroad and the Atbara Bridge.

A few weeks ago we noted briefly the fact that Lord Kitchener formally opened the Atbara Bridge on Saturday, Aug. 26. We find now in the English journals the following extracts from the speech which he delivered on that occasion:

It was not until 1896 that railway construction was commenced in the Sudan, and it is satisfactory to note that we have to-day 587 miles of line actually working north of the bridge, and 122 completed south, thus leaving 75 before reaching our goal—Khartum. During the work we have had many grave difficulties to overcome, principally caused by the military necessity of constructing the line without any proper detailed surveys. We all remember how, when pushing the line across the desert toward Abu Hamed, at the time when that place was still held by the Dervishes, we had to trust the accuracy of our direction to local informations and our own good luck. I am thankful to say that even under those conditions the line was so laid out that had we to make it again in perfect peace no change would be, in my opinion, necessary.

Another great difficulty has been the constant wash-outs, which, I am sorry to see, have done so much damage. In 1896 we had 17 miles completely washed away in one day, and no sooner was the damage repaired than a further wash-out carried away another 10 miles of line. This year I regret to learn that, though our line to the Atbara is now so well bridged as to prevent any serious breakdown, on the unbridged 120 miles to the south so much damage has been done by storms that our work has been delayed from one and a half to two months. In a country where such violent tempests are prevalent at this time of the year it is impossible to avoid these contretemps, which I am glad to see are being faced and overcome with the splendid spirit always shown by our officers and men.

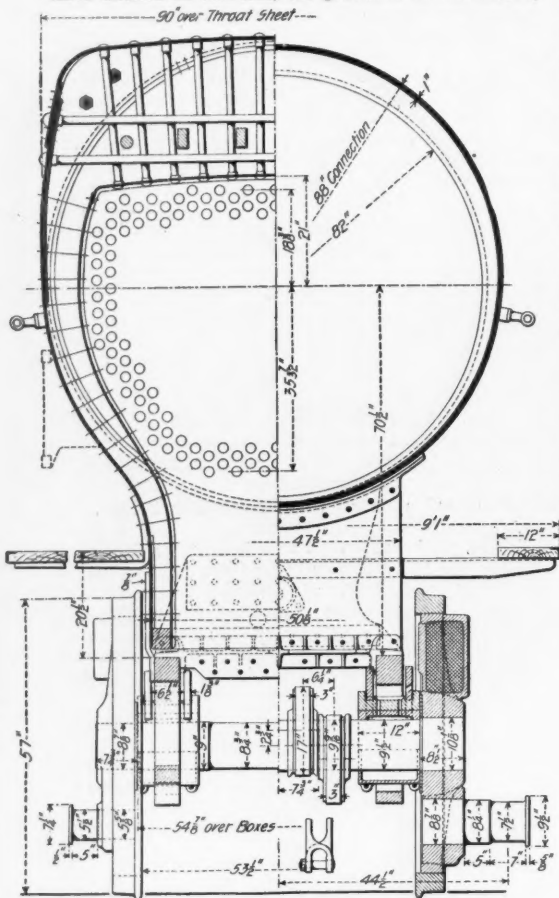
As regards this magnificent bridge, gentlemen, I think we may fairly claim that it is a record achievement. It was only well into last October that the credits were authorized for the extension of the line to Khartum. The site of the bridge had then to be determined, the borings, soundings, and sections of the river had to be completed, and eight solid double piers to carry the superstructure had to be sunk down to the rock below the river bed to meet the Atbara flood, which arrived twenty-five days earlier than our experience led us to expect. But, gentlemen, this did not catch us napping. Owing to the energy displayed, the piers were completed more than twenty-five days earlier than was thought possible. When the flood wave came it passed harmlessly, carrying away only the temporary bridge by which we pushed on railway construction to the southward.

In November and December every effort was made to place the order for the superstructure in England, but it was found impossible for British firms to supply so big an undertaking in the time allowed. This matter is one of considerable regret to me personally. I think it demonstrates that the relations between labor and capital in our country are not such as to give sufficient confidence to capitalists to induce them to run the risk of establishing great up-to-date workshops with the plant necessary to enable Great Britain to maintain her proud position as the first constructing nation of the world. Well, gentlemen, where Englishmen have failed I am delighted to find our cousins across the Atlantic have stepped in. The opening of this bridge to-day is due to their energy and ability and the power they possess in so marked a degree of turning out works of this magnitude in less time than can be done by any one else.

I congratulate the American foremen and workmen on the excellent success which has crowned their efforts in the erection of this bridge in the heart of Africa, far from their homes, during the hottest months of the year, and depending solely upon the labor of men speaking a foreign tongue. They have shown by their work the real grit they are made of.

I should also like to mention the excellent work of Messrs. Thomas & Company, by whom the piers have been built, and, while offering both firms our best thanks, I think, gentlemen, you must fully realize how impossible it would have been for me to carry out this railway construction in anything like the time or at anything like the cost had it not been for the indefatigable zeal of the young officers of my own corps, who have been responsible for this great work, as well as for the untiring efforts of the Egyptian officers, non-

commissioned officers, and men who have been employed on it. It is my pleasant duty to express to Lieutenants Macauley, Stevenson, Micklem, Midwinter and Newcombe, and El Kaimakam Mahomed Bey Rifaat and Messrs. Sanderson and Adams, and all those who have worked on this line, the gratitude of the officers,

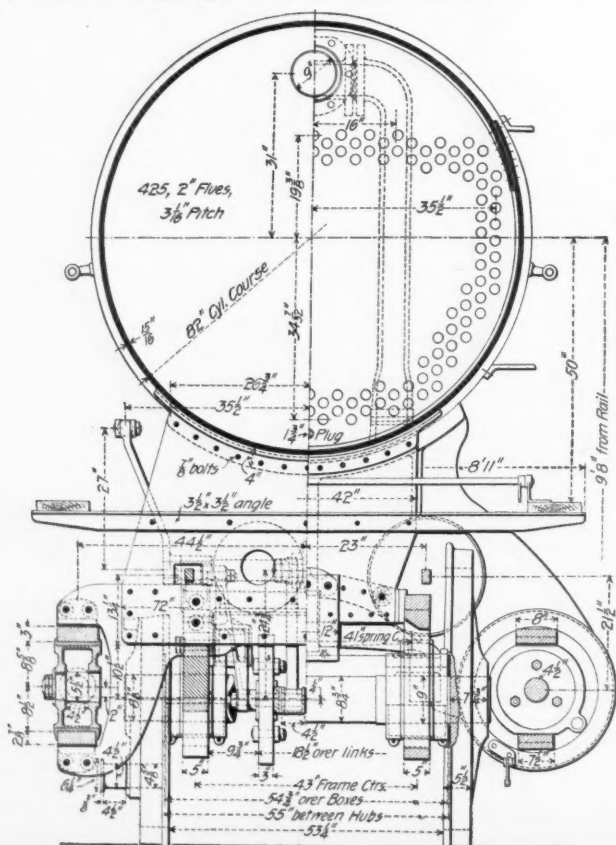


Sections Through Firebox and Boiler, 116-Ton Engine.

non-commissioned officers and men of the army and the people of the Sudan at the complete success of this great undertaking. We all hope they will shortly surmount the difficulties which still remain before them and thus enable me within the next four months to open the station at Khartum. When this has been done I think we may all look with confidence to the full enjoyment of the fruits of our labor.

The 116-Ton Illinois Central Twelve Wheel Locomotive.

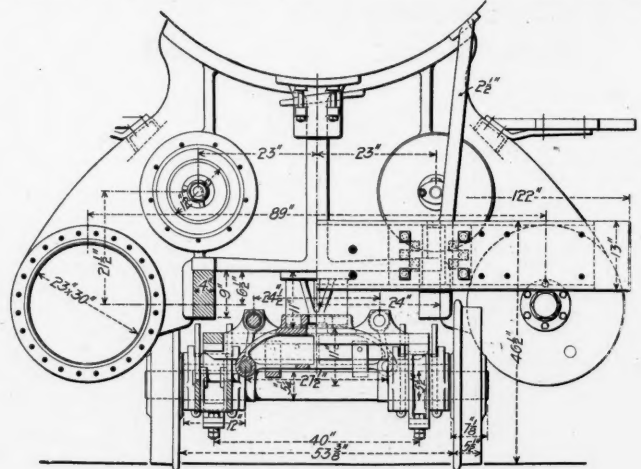
The heaviest locomotive ever built is shown in the accompanying engravings, and it will not require even a scientific use of the imagination to see that it is big all over, but it is so well proportioned that it has not a clumsy look. This engine, which has just been completed by the Brooks Locomotive Works for the Illinois Central Railroad, weighs complete 232,200 lbs., 83 per cent. of which is on the



Sections of 116-Ton Engine.

drivers. The total wheel base (engine and tender) is 55 ft. 3 in., the total heating surface is 3,500 sq. ft., and the grate area is 37.5 sq. ft. The cylinders are 23 x 30 in., and the working steam pressure is 210 lbs. The barrel of the boiler, which is 82 inches at the front, is made of steel, and the crown sheets are stayed with direct stays. There are 424 2-in. tubes with a length over tube sheets of 14 ft. 8 3/4 in. The tender is designed for 7,000 gal. of water and 12 tons of coal. The tank is 22 ft. long.

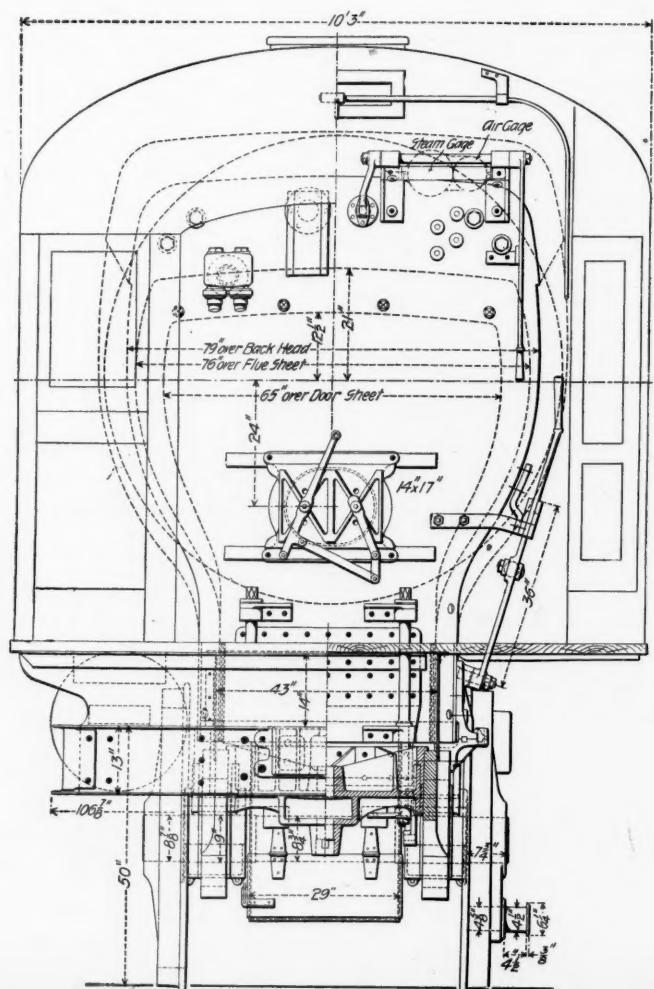
This locomotive resembles somewhat in general appearance the Pittsburgh consolidation engine of the Union Railroad, shown in our issue of Oct. 28, 1898, which it exceeds in weight by 2,200 lbs. It is much larger than the Pittsburgh, however, at the throat of the boiler, measuring 91 1/4 in., while



Saddle and Truck of Illinois Central 12-Wheeler.

Table of Dimensions of Certain Heavy Locomotives.

	Twelve-wheel locomotive, Illinois Central.	Pittsburgh Consolidation.	Pennsylvania, Class 11-5, Consolidation.	Twelve-wheel locomotive Great Northern.	Twelve-wheel locomotive Northern Pacific.
Name of builder	Brooks, Illinois Central.	Pittsburgh.	Penn. Railroad.	Brooks.	Schenectady.
Fuel	Bituminous.	Bituminous.	Bituminous.	Bituminous.	Bituminous.
Weight on drivers, lbs.	193,200	208,000	177,000	172,000	130,000
" " trucks	39,000	21,000	21,000	40,750	36,000
" " total	232,200	229,000	198,000	212,750	186,000
Wheel base, total, of engine	26 ft. 6 in.	24 ft.	25 ft. 11 1/2 in.	26 ft. 8 in.	26 ft. 4 in.
driving	15 ft. 9 in.	15 ft. 7 in.		15 ft. 10 in.	15 ft. 6 in.
Length over all, engine	42 ft. 9 1/4 in.	39 ft. 8 3/4 in.		41 ft. 4 in.	
Heating surface, firebox	263 sq. ft.	205.5 sq. ft.	197 sq. ft.	235 sq. ft.	205.5 sq. ft.
tubes	3,237 sq. ft.	3,116.5 sq. ft.	2,720 sq. ft.	3,045 sq. ft.	2,721.6 sq. ft.
Heating surface, total	3,500 sq. ft.	3,322 sq. ft.	2,917 sq. ft.	3,280 sq. ft.	2,943.4 sq. ft.
Grate area	37.5 sq. ft.	35.5 sq. ft.	34 sq. ft.	34 sq. ft.	35.0 sq. ft.
Drivers, diam.	57 in.	54 in.	56 in.	55 in.	55 in.
Cylinders, diam.	23 in.	23 in.	23.5 in.	21 in.	23 and 34 in.
stroke	30 in.	32 in.	28 in.	34 in.	30 in.
Boiler, type	Player Belpaire wagon top.	Straight, with slop'g back end.		Belpaire.	Extended wagon top.
Working steam pres. lbs. per sq. in.	210	210	185	210	200
Boiler, outside diam. barrel	82 in.	80 in.		78 in.	72 in.
Firebox, length	11 ft.	10 ft.		10 ft. 4 in.	10 ft. 3/4 in.
" " width	3 ft. 6 in.	3 ft. 4 1/4 in.		3 ft. 4 1/2 in.	3 ft. 6 in.
" " depth, front	90 in.	76 3/4 in.		86 1/2 in.	77 in.
" " back	81 1/2 in.	69 1/2 in.		79 in.	73 1/2 in.
Tubes, number	424	355	369	376	332
" " outside diam.	2 in.	2 1/4 in.	2 in.	2 1/4 in.	2 1/4 in.



The accompanying engravings and the following from descriptive specifications will show the details of the new locomotive.

Brooks Locomotive for the Illinois Central Railroad.

General Description.

Type.....12-wheel freight
Name of builder.....Brooks Locomotive Works
Name of operating road.....Illinois Central
How many and dates of delivery.....One-September, 1899
Gage.....4 ft. 8½ in.
Kind of fuel to be used.....Bituminous coal

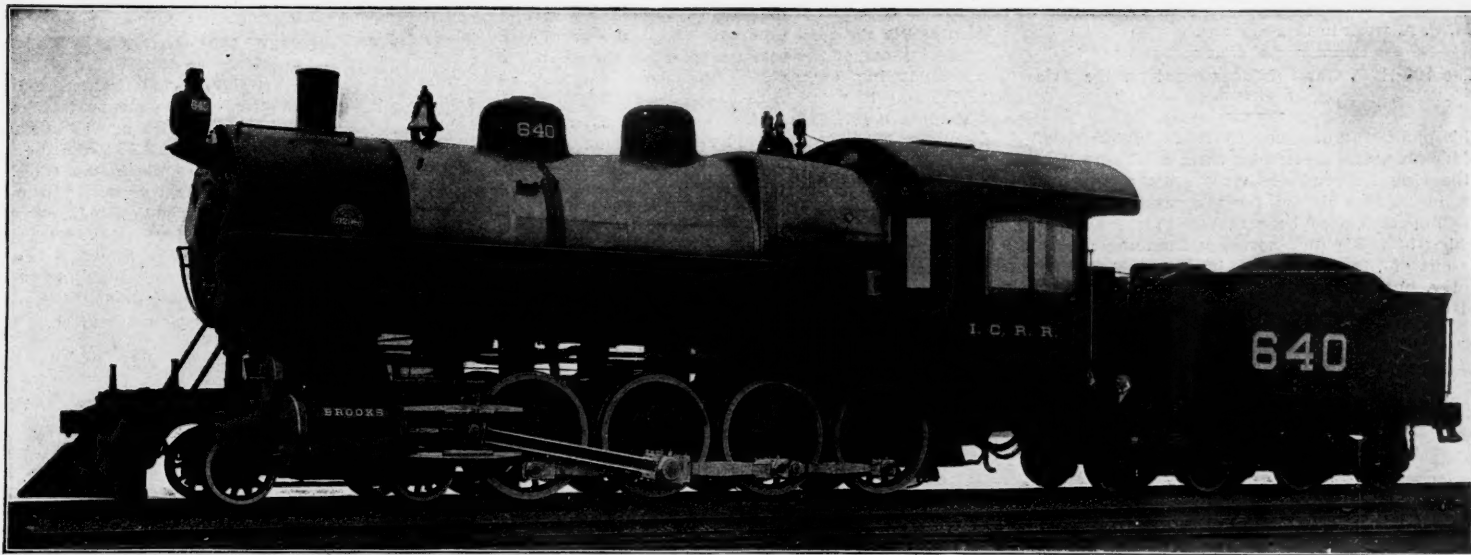
Seams, kind of horizontal.....Sextuple, lap
" circumferential.....Triple, lap
Crown sheets, stayed with.....Direct stays
Dome, diameter.....30 in.

Firebox, type.....Long, over frames
" length.....132 in.
" width.....42 in.
" depth, front.....30 in.
" back.....81½ in.
" material.....Steel
" thickness of sheets.....Crown, ¾ in;
tube, ¾ in.; side and back, ¾ in.

Safety valves.....Ashton
Injectors.....Hancock composite
Springs.....French
Metallic packing, piston rods.....Jerome
" valve.....B. L. W. Special
Spark arrester.....Improved Bell

Social Condition of Russian Railroad Men.

Mr. Clarence J. Hicks, one of the Secretaries of the Railroad Department of the International Com-



The 116-Ton Twelve-Wheel Locomotive for the Illinois Central Railroad.

MR. W. RENSHAW, Superintendent of Machinery.

Built by the BROOKS LOCOMOTIVE WORKS, Dunkirk, N. Y.

Weight on drivers.....193,200 lbs.
" trucks.....39,000 lbs.
" total.....232,200 lbs.
" tender, loaded.....132,700 lbs.

General Dimensions.
Wheel base, total of engine.....26 ft. 6 in.
" driving.....15 ft. 9 in.
" total, engine and tender.....55 ft. 2¾ in.
Length over all, engine.....42 ft. ¾ in.
" total, engine and tender.....65 ft. 7½ in.
Height, center of boiler above rails.....9 ft. 8 in.
" of stack above rails.....15 ft. 5 in.
Heating surface, firebox.....263 sq. ft.
" tubes.....3,237 sq. ft.
" total.....3,500 sq. ft.
Grate area.....37.5 sq. ft.

Wheels and Journals.
Drivers, number.....Eight
" diameter.....57 in.
" material of centres.....cast steel
Truck wheels, diameter.....30 in.
Journals, driving axle, main.....9½ in. x 12 in.
" other.....9 in. x 12 in.
" truck.....5½ in. x 12 in.
Wheel fit, main.....10½ in. x 8½ in.
Main crank pin, size.....7½ in. x 7 in.
" coupling pin, size.....8¼ in. x 5 in.
" pin, diameter wheel fit.....8½ in.

Cylinders.
Cylinders, diameter.....23 in.
" stroke.....30 in.
Piston rod, diameter.....4½ in.
Kind of piston rod packing.....Jerome
Main rod, length center to center.....98 in.

Firebox, brick arch.....On studs
" mud ring width.....Back, 4 in;
sides, 3½ in.; front, 4 in.
" water space at top.....Back, 5 in;
sides, 7½ in.; front, 4 in.

Grates, kind of.....Cast iron rock
Tubes, number of.....424
" material.....Charcoal iron
" outside diameter.....2 in.
" thickness.....No. 12 B. W. G.
" length over tube sheets.....14 ft. 8¾ in.

Smokebox, diameter, outside.....85 in.
" length from flue sheets.....75 in.

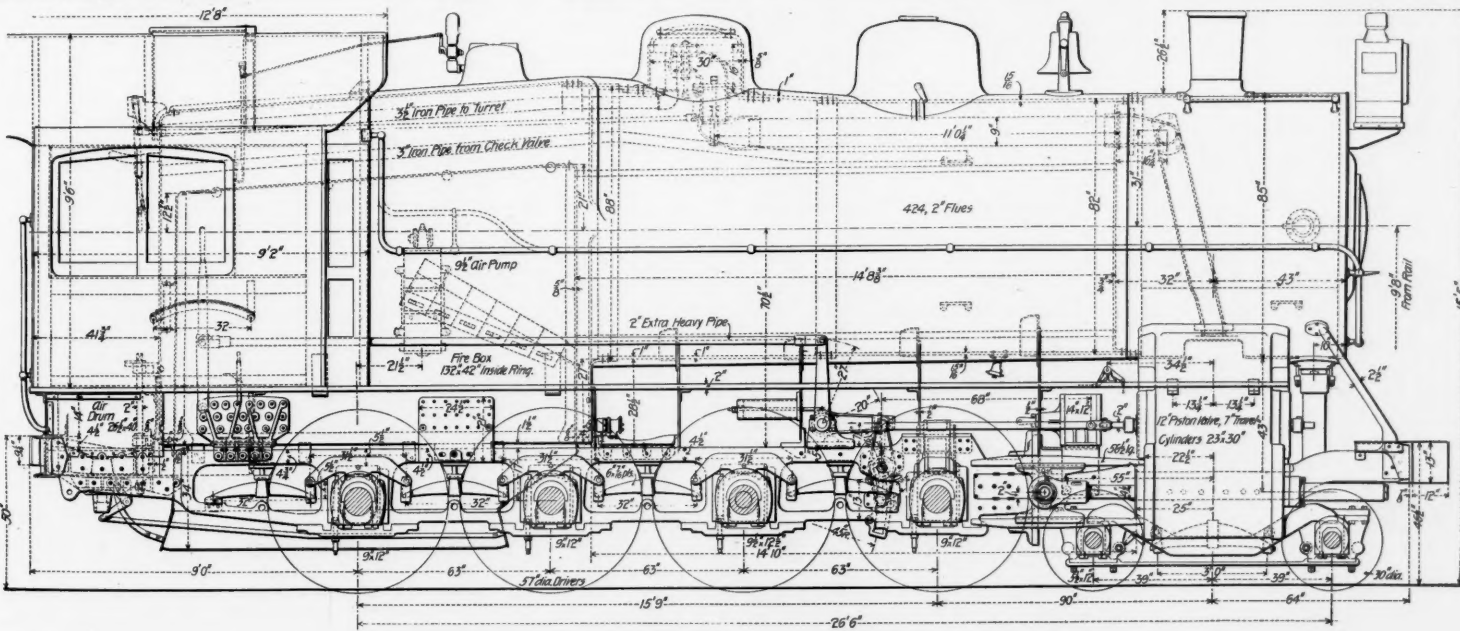
Other Parts.
Exhaust nozzle, single or double.....Single
" variable or permanent.....Permanent
" diameter.....6½ in.; 6½ in.
" distance of tip below center.....of boiler, 7 in.

Netting, wire or plate.....Wire
" size of mesh or perforation.....2½ in. x 2½ in.
and 2½ in. x 1½ in.

Stack, straight or taper.....Steel, taper
" least diameter.....15½ in.
" greatest.....17½ in.
" height above smokebox.....26½ in.

Tender.
Type.....8-wheeled
Tank, type....."U" shape
" capacity for water.....7,000 gal.
" coal.....12 tons
" material.....Steel
" thickness of sheets.....¼ in.

mittee of the Young Men's Christian Association, has lately spent three months in Russia examining the social conditions of railroad employees in that empire. Mr. Hicks went over at the invitation of Prince Hilkoft, Minister of Railroads, but he visited the private as well as the Government lines. He finds existing institutions much better than he had expected. The railroads at many important points provide comfortable sleeping and bath rooms for employees, hospitals and free medical attention, and homes for disabled and superannuated employees. There are three of these latter institutions which are maintained by the Government, and at Moscow there is one which is supported by a mutual society of employees of the Moscow Nijni-Novgorod road. A number of railroad libraries were found and others were being planned for. On the Kieff-Odessa road there is a library car, but only a few reading rooms were found. Free schools are provided for employees' children at places where there are no public schools. There are 32 technical schools which give young men a good training, and 6,000 Russian young men have graduated from these schools. Many of



Elevation of Brooks Freight Locomotive for the Illinois Central Railroad.

Steam ports, length.....28 in.
" width.....2½ in.
Exhaust ports, least area.....110 sq. in.
Bridge, width.....3½ in.

Valves.
Valves, kind of.....Improved piston
" greatest travel.....7 in.
" steam lap (inside).....1½ in.
" exhaust lap or clearance (outside).....Line and line
Lead in full gear.....¾ in. negative
" constant or variable.....Variable

Boiler.
Boiler, type of.....Player Belpaire wagon-top
" working steam pressure.....21 lbs.
" material in barrel.....Steel
" thickness of material in barrel.....1 in.
" tube sheet.....¾ in.
" diameter of barrel, front.....82 in.
" at throat.....91¼ in.

Type of under frame.....Oak
" springs.....Double elliptic
Diameter of wheels.....33 in.
" and length of journals.....5 in. x 9 in.
Distance between centers of journals.....5 ft. 3 in.
Diameter of wheel fit on axle.....6½ in.
" center of axle.....5½ in.
Length of tender over bumper beams.....24 ft. 0 in.
" tank.....22 ft. 0 in.
Width " ".....10 ft. 0 in.
Height " " including collar.....72 in.
Type of draw gear.....M. C. B. Thurmond

Special Equipment.
Brakes.....Westinghouse automatic for drivers,
tender and train service
Pump.....¾ in.
Brakes (driver).....American outside equalized
with shoes on back of wheels
Sight feed lubricators.....Nathan

these young men are now locomotive engineers. There are many railroad churches, and the priest is on the railroad payroll. On the Trans Caucasian line there is a chapel car, and the Siberian Railroad also has one. In many railroad shops there is a stage where theatrical performances can be given. At small towns there are many dwelling houses provided by the railroad for employees. On the line from Rostoff to Vladikaukas (not a Government road), several new buildings are being put up at division points for reading rooms and libraries.

The principal criticism made by Mr. Hicks is the absence of any means for enlisting the interest and co-operation of the employees in the control and

management of the various institutions. There is a temperance society at Tiflis, among shopmen, but aside from this nothing of the kind is mentioned. The paternalistic character of all the provisions here described results in a marked lack of moral force and unity, which is such a vital feature of the religious and moral work for railroad men in America. Nothing can be done to improve the situation in Russia until men can be secured and trained to act as secretaries. It is possible that Prince Hilkoﬀ will send some men to America next year to examine the Y. M. C. A. work in this country.

The 400-H. P. Gas Producer Plant for the Erie Railroad.

This plant was designed by R. D. Wood & Co. of Philadelphia, and erected by them at the new shops of the Erie Railroad at Jersey City, where it has been in successful use for six months. There is some importance to be attached to the successful working of this plant, not only from the fact that it is one of the first of its kind to be built in this country, but because it shows that where the right kind of fuel is available, power from producer gas

gave a net result in heat units considerably in excess of the guarantee. The Otto gas engines, which are run by the gas from this plant, give an indicated horse power on from 11,000 to 12,000 heat units per hour, corresponding to a thermal efficiency in the engine of about 22 per cent. and a consumption of about 85 cu. ft. of the producer gas per horsepower hour, which is equivalent to about 1.1 lbs. of coal. These results were obtained from the weights of fuel, measurements and analyses of gas and from indicator cards from the engine, under the direction of the Erie Railroad Company's testing department.

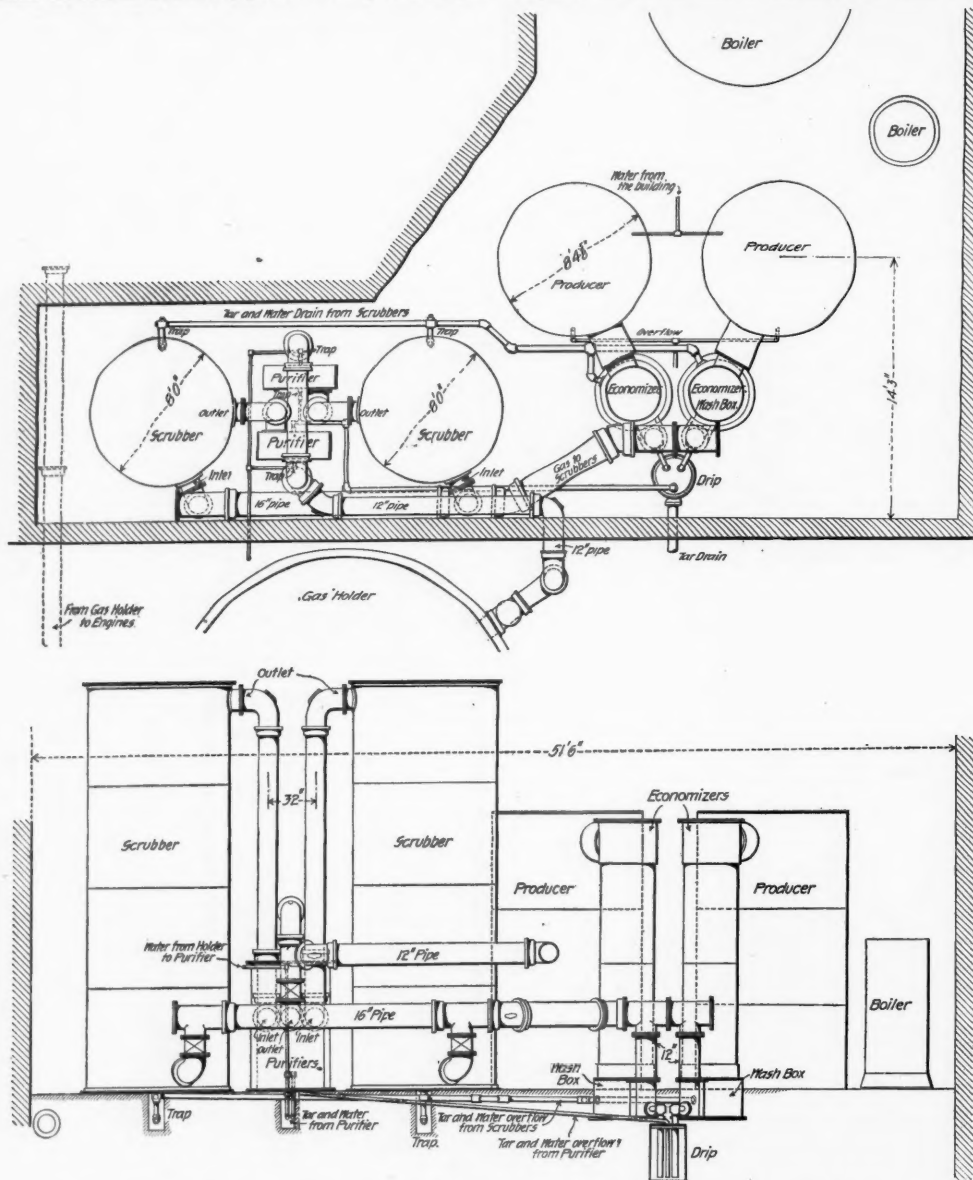
The lay-out of the producer plant is shown in the accompanying engravings, the main features of which may be referred to here.

Producers and Economizers.—The two 7 ft. Taylor revolving bottom gas producers are surmounted by the Bildt patent automatic feeders. By this combination the gas is produced continuously and uniformly at any pressure desired, and the labor is reduced to a nominal amount; less than would be required in firing steam boilers of the same capacity. From the producers the gas passes through the economizers, which stand vertically and are designed to cool the gas and impart its heat to the incoming blast of air

rectangular boxes filled with specially prepared material, to catch the remaining particles of tar, and further arrest the sulphur carried over from the scrubbers. From the purifiers, the gas passes into the gas holder outside the building, and thence to the main leading to the engine house, as shown in the top view.

Gas Holder.—The gas holder is large enough to carry a supply for about 10 minutes, and balances the irregularities in production, consumption and constitution of the gas. In it a large volume of gas is carried and mixed, so that the analysis is maintained sufficiently uniform.

General Details.—It will be noted that there is a drip pot, into which all the separate parts of the apparatus are drained of tar, which overflows automatically into the sewer. Water used to cool the top of the producers is carried into the holder tank in order to prevent the tank from freezing. The coal is raised from a storage bin by a link belt elevator and discharged automatically into the receiver of the automatic feed. The hopper of the feed has a capacity for several hours' run, hence requires but intermittent charging. The feeding device runs continuously and its speed is under easy control of the



The 400-H. P. Gas Producer Plant for the Erie Railroad—Built by R. D. Wood & Co., Philadelphia.

used directly in gas engines costs about one-half as much as the same amount of power produced by a good steam engine and boiler, and at about the same first cost. At Jersey City the plant has been found entirely reliable for such work as furnishing power for electric lighting and shop tools.

Messrs. R. D. Wood & Co. guaranteed that the plant should run successfully on anthracite buckwheat coal, but it has been found that very good results are obtained from a still smaller size (rice), at a lower cost. The manufacturers' guarantee was to deliver in the gas on an average of not less than 10,000 British thermal units for every pound of buckwheat coal burned, which would correspond to an efficiency of production of fully 80 per cent. This would correspond to producing 80 cu. ft. of gas having 125 heat units per cubic foot from every pound of coal.

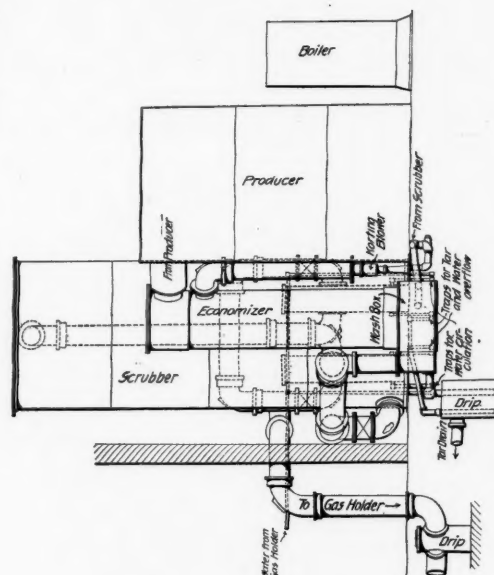
However, after the contract was made, a modification in the design was decided on by the engineers of R. D. Wood & Co., with a view of increasing the heat energy of the gas and reducing its volume. The result of this effort was entirely successful, the gas analyzed an average of 141 heat units per cubic foot, and this from the fine rice coal, which is almost refuse. The volume of gas was also reduced, and

and steam to the producer. It will be noted that while the gas enters the top of the economizer and passes out through a wash box at its base, the air is drawn by means of a Korting steam blower upwards from the bottom of the economizer and out near its summit, where the hot gas enters.

Wash Boxes.—The wash boxes serve to prevent a large portion of the tar going into the scrubbers and also act as automatic seals, preventing the gas from the holder passing backwards into the producer.

The small amount of steam required to run the Korting blowers can, of course, be obtained from any available source, but at Jersey City there will be periods in the year when no steam plant will be in operation, so a small vertical boiler was installed for summer firing.

Scrubbers.—From the wash boxes the gas passes into the base of two larger vertical scrubbers, the compartments of which are filled with coke, which is continually wetted by a spray of water from above. The use of these scrubbers is to extract from the gas a sufficient amount of the ammonia, tar and sulphur to leave it clean enough for use in the engine. From the top of the scrubbers the gas is conducted downwards to the purifiers, which are



attendant, so that the amount of fuel being fed can be regulated at will. As it is fed, the coal is sprinkled or sifted in uniformly over the entire gas producing surface, and to those familiar with the customary labor and difficulties of maintaining a proper condition of bed in a gas producer, the advantage of this automatic charging will be at once apparent. Not only is the labor largely reduced, but regularity in quality and quantity of gas is absolutely assured.

Street Railroad Costs in New York City.

The September number of the Street Railway Journal gives an interesting comparison of receipts and expenses of cable, electric and horse lines of the Metropolitan Street Railway Co., New York, for the year ending June 30, 1899, compared with those of the year ending June 30, 1898. During the last year the car-miles, over the same length of track, as in the year before, was nearly 42,000,000 miles, as against 35,000,000 in the previous year. The new cars were, moreover, nearly double the capacity of the old ones. The passenger receipts increased nearly 25 per cent., while the receipts per car-mile increased from 29.7 cents to 30.7 cents, or about 3 per cent. The traffic of the cable lines fell off about 10 per cent. and on the horse lines about 30 per cent., while the electric lines carried three times as many passengers for the year ending June 30, 1899, as in the 1898 period; and their receipts per car-mile increased from 26.99 cents to 31.23 cents. As an average of the three systems it is found that the operating cost per car-mile last year was 15.18 cents, as against 15.83 cents the previous year, and the earnings from operation, 15.5 cents, as against 13.87 cents for 1898; and all this increased net earnings must be credited to the introduction of electricity.

Last year the per cent. of operating expenses to total receipts was 47.4 per cent., while for the year before it was 50.7 per cent. In our issue of Nov. 4, 1898, were given the detailed costs for working the cars of the street railroad for the year ending June 30, 1898. A similar table follows for the year ending June 30, 1899, as given in the last issue of the Street Railway Journal.

	Cable.	Electric.	Horse.
Maintenance of way.....	4.69	.68	.99
Maintenance of equipment.....	1.13	1.17	.42
Power.....	2.39	1.77	6.69
Transportation.....	8.43	7.06	8.24
General expenses.....	1.35	1.37	1.62
Total.....	17.99	11.95	17.96
Car miles run.....	10,416,079	19,347,978	11,966,799

The New York Central Class P Mogul Freight Locomotive.

[WITH AN INSET.]

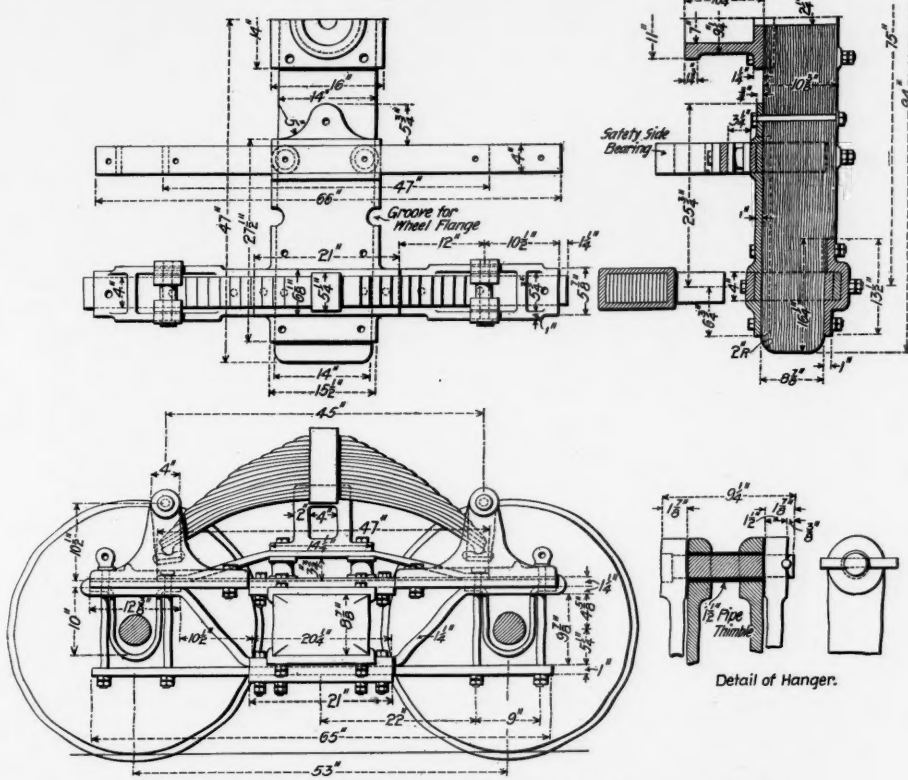
In our issue of June 30 last, was given a comparison of the mogul freight locomotives of the 1889 (Class J) and the 1898 (Class P) designs as adopted

these locomotives may be mentioned. Cast steel is used for the driving-wheel centers and the foot plate. The front end of the boiler is made of pressed steel and the side and main rods are of mild open-hearth steel. The driving boxes are of gun iron. In the new engines the brakes will be put on the back instead of on the front of the wheel, and there will be

at a place where they often prove weak, does not detract from the outside appearance.

On the frame there is a cast steel filling (not shown in our drawing) between the cylinder and the front pedestal.

With the exception of the hanger the tender truck is of the design common to the New York Central



Tender Truck of Class P Mogul - New York Central & Hudson River Railroad.

by the New York Central & Hudson River Railroad. For the purpose of giving some notion of the progress along certain lines as the result of nine years of progress in locomotive construction, special reference was made to the changes of the materials used and to the more important improvements over the Class J type. The type of moguls adopted in December last will probably not be materially changed for some time to come; there may be, however, considerable modification in the less essential features. The engravings on the inset and the tender truck shown herewith are sufficiently complete to make a long description unnecessary.

The Class P moguls have cylinders 20 x 28 in., weigh when loaded 152,000 lbs., and with the tender 248,000 lbs. The total heating surface is 2,583 sq. ft., which is about 100 sq. ft. more than for those of the 1889 design. The general dimensions of the engines are as follows:

Cylinder diameter and stroke	20 x 28 in.
Steam port	18 x 1 1/4 in.
Exhaust port	18 x 2 3/4 in.
Valves, Richardson	1 1/2 wide
" travel	American balanced
" outside lap	5/8 in.
" inside lap	3/4 in.
Exhaust nozzle (double) diameter	3 3/4 in.
Smoke stack (I. D.)	16 1/2 in.
Boiler diameter, smallest ring (outside)	67 1/4 in.
" pressure per square in.	180 lbs.
Firebox, length outside	117 1/2 in.
" width outside	47 1/2 in.
" depth inside	(80 front) 108 1/4 in.
Fire grate, length	108 1/4 in.
" width	38 1/2 in.
" area square feet	29.33
Flues, number	371
" outside diameter	2 in.
" length between sheets	12 ft. 1 1/2 in.
" heating surface square foot	2,372
Firebox, heating surface square feet	211
Total	2,583
Weight engine, working order	152,000 lbs.
on drivers	131,600 lbs.
on truck	20,400 lbs.
" maximum, tender loaded	96,800 lbs.
Kind of brake	American-Westinghouse
Driving journals	9 x 12 in.
Engine	10 x 16 1/4 in.
Tender	4 1/2 x 8 in.

a single instead of a double nozzle in the engines which are now being turned out, although the first design of the recent engines provided for two nozzles. In the original design, the wheel guards were put on as shown in the engravings, but they will be

engines. The 1 1/2 in. pipe there shown protects the hanger, and this can be renewed when worn.

In our issue of Oct. 28, 1899, we printed some data from a number of tests showing the performance of these engines on regular runs with heavy train loads. Some indicator cards taken on the run of Oct. 12 last were also shown, and from which the horse power was figured, the maximum on that day being 815.5 at a speed of 19 1/4 miles an hour, with the steam pressure 172 lbs. and while the train was ascending a grade of 10 ft. per mile.

Some of the data taken on that day are given in the accompanying table. At the same time records were made showing the train speeds for short distances on the trip. These curves are shown herewith, and form the basis for interesting study. It will be noted that there is no immediate effect of the grade on the speed of the train. This is in part due to the fact that the train was 3/4 of a mile long and the observations were taken on the cab of the locomotive. The total weight of the train was 3,428 tons, and a helper was required on some of the grades, as noted under the profile. The rails were in good condition during the runs and the wind light or favorable. The engine consumed on the average 12.9 lbs. of water per car each mile during the run, and the equivalent evaporation from and at 212 deg. was 9.45. Data from other runs are also given in the accompanying table.

The diagrams showing the tons hauled one mile per pound of coal for different train loads are here shown to call attention to the falling off in the loads hauled as the train load was increased.

These engines are hauling on an average from 25 to 30 more cars than those of Class J, which were used for freight service before the Class P engines came into use. During the first two weeks in June,

Runs Between West Albany and De Witt.

Date	Oct. 3.	Oct. 11.	Oct. 12.
Terminal points	W. A. to D. W.	W. A. to D. W.	D. W. to W. A.
Weather	Fair.	Fair and rainy.	Rainy and fair.
Condition of rail	Good.	Slippery and good.	Slippery and good.
Velocity of wind	Trace.	Light, diagonal.	Light and favorable.
Temperature atmosphere	70	65	61
Temperature feed water	67.5	65.6	61
Steam pressure	179	178 and 179.	178 and 179.
Elapsed time	11 hr. 31 min.	10 hr. 38 min.	12 hr. 49 min.
Detentions, number of	6	7 min.	9 min.
Running time	9 hr. 49 min.	9 hr. 2 min. 53 sec.	12 hr. 38 min. 15 sec.
Average speed, miles per hour	14.2	15.3	13
Number cars in train	126 Lt. 1 load.	101 light and caboose.	81 loaded and caboose.
Loaded weight train, tons	1,834	1,531.31	3,428
Number tons hauled 1 mile	254.96	212.832	476.492
Gallons water used, actual	18,839.8	16,178.4	18,575.2
Pounds water used, actual	140,331.7	129,427.2	154,793.3
Pounds water used in run	138,131.7	128,600	147,975
Pounds coal used, actual	20,200	19,130	22,190
Pounds coal used in run	19,600	19,000	21,215
Pounds coal per car per mile	1.11	1.53	1.86
Coal consumed per 100 tons hauled 1 mile	7.7	8.9	4.45
Tons hauled 1 mile per pound coal	12.8	11.1	22.4
Tons hauled 1 mile per pound water	1.88	1.65	3.2
Average evapo- ation per pound coal, actual	6.95	7.05	6.97
Equivalent evaporation from and at 212° per pound coal	8.13	8.25	8.2
Per cent. moisture	1.5	1.5	1.5
Equivalent evaporation per pound dry coal, average	8.57	8.57	8.32
Factor of evaporation	H - h 965.7 = 1.17.		

removed, as well as from all the freight, and probably from the passenger engines now on the road.

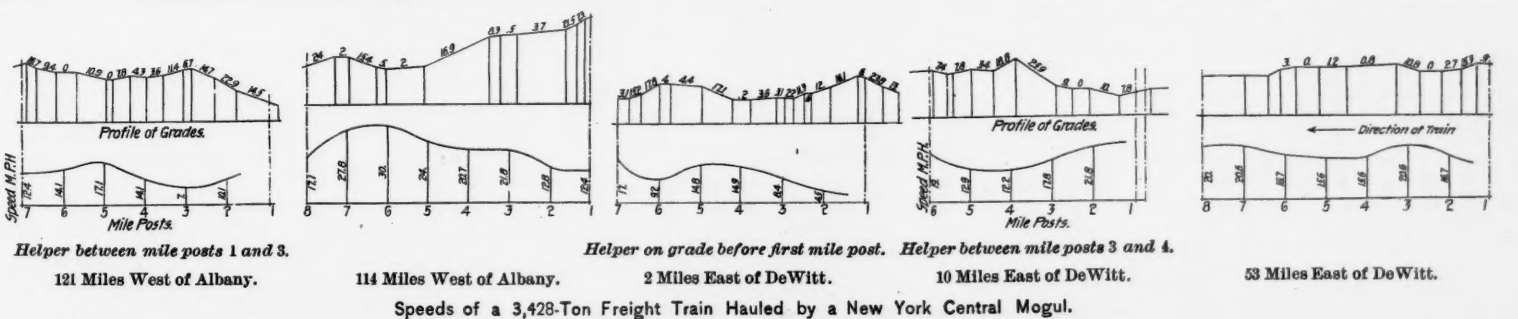
The extended piston-rod casing is shown, together with sections of the front and the back of the cylinder heads.

The grate is of the common rocking type. It is worked by a lever which is locked when in a vertical position, and the handle must be raised to the position shown in the drawing before the grates can be moved.

1899, one of the new engines hauled on an average of 68 loaded cars, so that these very heavy hauls are made every day, and results as good as those given in the accompanying table are obtained daily.

Dazzling Lights at Highway Crossings.

Among the many schemes adopted by cities and towns to get something out of the railroads for



Crank pin, main	6 x 6 in. and 6 3/4 x 5 1/4 in.
" front	5 x 3 3/4 in.
Ratio heating to grate surface	131 x 3 3/4 in.
Tractive force per pound, M. E. P.	196.5
Adhesion to tractive force	.23

Some of the principal features in the design of

The saddle has been cored, leaving five ribs, three of which are 1 in. thick and two are 3/4 in., as shown in the plan to left of the saddle on the inset. This design gives large air spaces, protecting the live steam passages and, while it strengthens the saddle

nothing, that of requiring street crossings to be brilliantly lighted at night is not the least ingenious. In Indiana there is a statute which specifically empowers cities to do this, and in a number of cases municipalities have passed ordinances which were so

extreme that the railroads have contested their validity. The existence of a 2,000 c. p. light at a crossing having proved in many cases a convenience to wayfarers, the average alderman is not slow in seeing that the railroad company, with its boundless wealth, might easily provide such light at all crossings.

An officer of the Pittsburgh, Cincinnati, Chicago & St. Louis has given us the particulars of a case at Richmond which was decided against the railroad in the lower court, but which is now pending on appeal. Suit was brought, in the interest of the city, to enforce the penalty which had been prescribed for the violation of the ordinance, the railroad having neglected to provide the electric lights which the city wanted. In accordance with the terms of the statute, the city of Richmond required electric arc lights at crossings on streets which were provided with arc lights at other places.

In the cases of this kind which have been decided by the Indiana Supreme Court, the statute has generally been declared valid, but it is held that the municipality must not under the guise of requiring crossings to be lighted undertake to require a railroad to light its streets.

Two principal questions are presented by the cases now pending. First, it is claimed by the railroad that it has proposed to light the crossings amply and sufficiently for all purposes of safety by street lamps, sufficient in number to accomplish the purpose; and that the purpose of the city, and its declared intention in the passage of the ordinance is, to require the company to maintain lights where the city now has lights located, and thereby enable it to remove such lights, and thus cast the burden of street lighting to this extent upon the railroad company. The city has a burdensome contract with a local company, and is trying to escape some of its burden under this contract and cast it upon the company.

The second question is, that electric arc lights in fact are not a means of safety at railroad crossings, but add to the dangers at such crossings, because they render the locomotive headlight less effective, blind the engineman by their power, and render all the signal lights less efficient; therefore they constitute an increased danger and do not accomplish any purpose of safety; and the police power being limited to that which does benefit the public the proper and lawful exercise of the power depends upon the question of fact whether the means declared actually does accomplish the purpose of safety, or whether it increases the danger. In other words, the Legislature is without power to say that a particular means shall be used to accomplish a purpose of public safety, which in fact increases an already existing public danger. And it is claimed that this is a judicial question, for the courts to decide.

Maintenance and Operation of a Railroad Telegraph Department.*

BY W. S. GLOVER.

On most railroads the telegraph department is sadly neglected. Most of us have a few good lines and some copper wire and a little cable; but as a general thing, poor wire, obsolete machinery and antiquated office equipment are the rule. When the weather is damp we go out of business in the telegraph department and send our telegrams by mail. Many a dollar is lost because the traffic department cannot make rates promptly by wire.

There is no excuse for this. Circuits which will never be weatherbound can be provided at comparatively small expense. Repairs should not wait until a line falls down or is demolished by wind, but should be made when required, as in the case of bridges and locomotives. The construction gang should be organized in March when the better class of laborers are looking for work. If your force of men is large, a boarding-car and tool-car outfit should be provided.

Poles cannot be set a uniform distance apart; 35 to the mile with 40 on curves is perhaps the most common rate. One-fourth of the filling around a pole should be coarse gravel or crushed rock. On curves, poles should lean slightly outward. Where the grade is uneven, keep the tops of the poles as near even as possible. In ascending, grade up 2 ft. to the pole. Shorter poles might be used with satisfactory results. Within a year or two the speaker had known poles 20 ft. long used to carry eight wires. In England, 16 ft. poles are used with good results. Short poles are less expensive and there is less resistance to the wind. Head guys should be used as little as possible; these and lightning rods frequently make good escapes. Mr. Glover understands that the Western Union has discontinued the use of lightning rods on new work.

Where there is much smoke, a copper wire should be used; iron will not withstand the gases more than four or five years. Poles are destroyed by fire oftener than by decay; coarse gravel or broken stone should be piled around the foot of each pole 12 in. deep. Lines should be thoroughly inspected once a year.

Battery current costs 41 cents per thousand watts. Dynamo current, 2 cents per thousand watts—39 cents less. A flow of 30 milliamperes per hour is

enough to draw on your battery, for if called on for more you decrease its efficiency. Main batteries should receive almost daily attention, keeping uniform gravity and internal resistance in each cell. Six pounds of vitriol will consume one zinc. It should be used in small quantities at a time as needed. Avoid jarring and stirring up the fluid. In drawing off the fluid keep the white, or zinc sulphate, and the blue, or copper sulphate, fluids separate. This you can do if handled carefully with a syphon or battery syringe. In putting back old fluid in the jars put the copper sulphate fluid in first, then carefully add the zinc sulphate. By doing this you will get immediate action and better results. Care should be taken to keep the zinc sulphate from becoming a saturated solution. In that condition it crystallizes, stops chemical action and short circuits the cells.

The line foreman should be an operator as well as a goot outside man. Soldered joints should be most carefully watched and each piece of telegraph machinery in each office should be inspected every one or two months, and this by a man sufficiently interested in the service to detect the slightest defect. He should take along with him spare relays, keys, office wire, key springs, jars, zincs, vitriol, etc. Go on the local freight, and hold the train if necessary to finish your work at a station. All instruments should be measured for their resistance. Instruct operators how to keep their apparatus in good order. Operators should report by wire any defects or needs. Respond promptly; indifference tends to make the operator indifferent. Keep a careful record of material sent out and you can readily locate a wasteful operator. A line of 500 miles will use 2,000 to 4,000 insulators yearly, costing 8 cents each. To reduce this expense and lessen trouble, trainmen and section men should report trespassers and punishment should be inflicted on such law breakers.

On old lines with numerous offices, a low resistance relay will give best results. Mr. Glover has used multiple relays, but prefers a series wound instrument. Each line should be carefully examined to see what battery and what instruments will give the best service. Each division operator should have a milliammeter, a voltmeter and a galvanometer, so that he can locate all kinds of defects. Magnet cores should always be kept as close to the armature as possible. If turned back in wet weather they should be restored as soon as possible. The high potential on a line should be at the end farthest from the dispatcher's office; this enables the dispatcher to get along with less fighting for circuit. A separate battery should be used for each wire. All of the foregoing subjects should be covered in the book of rules and applicants for positions should be required to have a thorough knowledge of the book.

In the discussion on Mr. Glover's paper, most of the speakers agreed with him, citing their experiences in corroboration of different parts of the address. Mr. Hammond (K. C., F. S. & M.) thought that careless maintenance of local batteries was often the cause of errors in messages; an operator lets the battery get so weak that he cannot properly adjust the sounder, and then he guesses at words.

Mr. Rhoads (C., C. & St. L.) has abandoned box relays. He is introducing low resistance relays. He finds it hard to get operators who will make good linemen, and he thinks that the Western Union is not discontinuing lightning rods.

Mr. Ryder (C., B. & Q.) told of the work of the committee of the Association of Railroad Telegraph Superintendents, which had reported in favor of using low resistance relays. He endorsed the suggestion that offices should be frequently inspected, but called attention to the fact that most division operators have their time so fully occupied that they cannot visit the offices on the line.

Mr. Chenery (Union Station, St. Louis) has found marked satisfaction in using 25-ohm relays.

Mr. Ryder answered the objection that low resistance relays necessitated increased expense for batteries by citing a case where a record was kept for two or three years and it was found that the increase was not appreciable.

Mr. Garrett (Wabash). At one of our offices requiring 15 operators, three sets working eight hours each, we employ 16 men, so that one can be out on the road all the time, thus getting acquainted with the agents, operators and trainmen. We have a first class dispatcher's office. Replying to a question, Mr. Garrett said that this meant an office in the tenth story where you can pull the ladder up after you. No one should converse with the dispatcher in office hours, except through the telegraph office.

An Electric Railroad Driven by Westinghouse Gas Engines.

In June, 1898, the Long Island Railroad began running an electric line in Huntington, L. I., using three 50-h.p. gas engines at the generating station. Before its purchase by the railroad, the street car line was run by horses. The road is three miles long, and the heaviest grade $4\frac{1}{2}$ per cent., and the car mileage is about 200 a day. The gas engines take the gas supply from the local gas company, the rate

paid being 90 cents a thousand cu. ft. and the amount consumed per car mile being about 46 cu. ft. The engines are the standard Westinghouse design of the type described and illustrated in our issue of Sept. 15, with a special design of electric igniter, which takes its current from the 500-volt railroad generators after it has passed through 20 incandescent lamps (connected in four groups of five lamps each in series) and through a spark coil. The voltage across the igniter circuits is reduced to seven volts by means of three tumblers, with lead strips bent over and dipping into a sulphuric solution which take the current when the igniter circuits are open and the absorbed charge is given out again to the igniters as soon as their circuits are closed. When starting the igniters are supplied by a 12-cell primary battery.

This is one of the first roads to be run by gas engines, and thus far the trial has been very satisfactory. The working expenses, including the wages of motormen and conductors, are 13 cents a car-mile, which may be regarded as very good for a road where but three cars are in service and which for most of the time runs but one car.

A storage battery of 265 cells is used in connection with the four-pole 550-volt Westinghouse generators and these are worked without booster directly in multiple with the dynamo or dynamos, the latter having special combined windings, by means of which their voltage is made to fall off as the load rises to such an extent that the battery will take the greater part of the load fluctuations.

Steel Foundations for Steam Railroad Track.

By Gustav Lindenthal, C. E.

(Continued from page 657.)

VII.

One feature, which is very annoying to the trackman, will be greatly diminished, if not entirely absent with this track system. That is the creeping of the rails. As is well known, rails creep in the direction of the traffic, whether up grade or down grade. On single track, rails creep in the direction of heavier traffic; otherwise they creep down grade.

The force with which a track is creeping seems almost irresistible. Notching the rail base for the spikes was one of the means employed to stop it. But the spikes were gradually sawed into, pulled out or sheared off by the creeping rails. Later, when the practice of notching was given up, because steel rails were apt to break at the notched places, spiking of the angle bars at the rail joints was resorted to. Special angle brackets or straps bolted to the rail between joints are also used. But all in vain.

Several explanations have been given for the phenomenon, but none accounts for all its peculiarities satisfactorily. My own view is that creeping is caused by the push of the rolling friction of the wheels on the rails. If, for illustration, we imagine the cars mounted on skids instead of wheels, the creeping would be greater in the proportion as sliding friction is greater than rolling friction. The drivers of the locomotive are the only wheels exerting a pull on the rails, which for the time being are pinned down and so cannot move. The pull is transmitted by friction through the ties to the ballast and earth underneath, the whole forming an anchorage—but a traveling anchorage—always located under the locomotive, whether pulling by adhesion, or through cog-wheels on a rack rail.

All other wheels behind the locomotive exert a push on the rails through rolling friction in the direction of the train.

The coefficient of rolling friction varies with the velocity of the train, from nearly one per cent. for slow velocities to four per mill for trains at and over 30 miles per hour. It also varies on curves. The average value for fast trains on tangents and curves may be assumed for illustration at 5 per mill. A car wheel loaded with 10,000 lbs. will thus exert a push of 50 lbs. on the rail.

As the friction between the loaded rail and the ties—disregarding the holding power of the any way imperfectly fitting and usually loose spikes—is at least 30 times greater than the rolling friction of the wheels, the rail could not possibly move or creep under a smoothly rolling load.

But the wheels do not roll smoothly and moreover they do not roll over continuous rails. The rails are in lengths from 30 to 60 feet, with space between the ends for expansion. The wheels get upon each rail length suddenly, and instead of a quiet push or a static force of 50 lbs. per wheel, there is a horizontal blow or a dynamic force, the effect of which increases as the square of the velocity of the train.

It should be understood that this horizontal blow is not caused by the depression of the rail ends or by the space left for expansion between them, although both these features, when they exist, undoubtedly augment its force. It is unavoidable with the smoothest and any kind of rail joint (including the joint in which the outside splice bar carries the wheels over the rail ends) because the longitudinal strain is set up suddenly in each rail length, and cannot be transmitted to the next rail, unless the rail ends were tightly pressed together, equivalent to a continuous rail.

*Abstract of a paper read before the Central Association of Railroad Officers at St. Louis, July 18, 1899.

Taking 40 miles per hour, a usual speed for fast freight trains, equal to 60 ft. per second, the impact from the rolling friction of the wheel will be $50 \times 60^2 = 180,000$ foot-pounds, which in effect is the same, as if an iron ram, weighing one ton, would hit the end of the rail with a velocity of $9\frac{1}{2}$ ft. per second. The car wheels being spaced 5 to 20 ft. apart, will deliver upon the receiving end of a 30-ft. rail from 3 to 6 such blows per second. If the rail is not rigid and smooth, if, on the contrary, by reason of defective or yielding supports, it deflects and by its resilience causes the wheels to rebound and ricochet, so that they no longer roll with uniform pressure, then each wheel will hit the rail as many additional horizontal blows as it makes jumps or rebounds. A rebound every few feet is an ordinary occurrence on spiked track. A 30-ft. rail may thus receive from 30 to 60 glancing blows per second, and from a train of 40 cars a total of 1,500 to 3,000 blows, varying in effect from a few foot-pounds to 180,000 and more per blow, lengthwise with the rail and in the direction of the train.

With this explanation it is not difficult to understand why the creeping should seem irresistible, the rails shearing off spikes and bolts and wandering up steep grades. In principle, to make it plain, it is the same dynamic effect with which the blows from a 10-lb. hammer will suffice to overcome the friction (of over 5,000 lbs.) of a rail spike in an oak tie.

A rail may be held down by spikes and by the moving loaded cars, but it will nevertheless be displaced by their dynamic effect in the manner stated.

Each rail moves individually and independent of the adjacent rails. The play left for expansion at the joints facilitates the creeping. There could be no creeping with a continuous rail.

All observed facts can now be satisfactorily explained. There is no creeping in switch yards or on side tracks, on which trains move slowly and in opposite directions. Compared on the basis of ton-mileage, the rate of creeping is greater on tracks for fast trains, and with short or light flexible rails, and on poorly ballasted and yielding foundations. Every cause which induces or increases rebounding of the wheels (as poor rail joints) will increase creeping.

On down grades, where the locomotive is not pulling, the effect of its wheels will be added to that of the car wheels, and on that account and by reason of the greater velocities on down grades, the creeping will be greater. So also the outside rails on curves, creep faster than the inside rails, because exposed to greater pressure and friction, causing harder glancing blows.

Is there no remedy for the creeping of jointed rails?

It may be said that, theoretically, there is none, because the dynamic force could be resisted only through the elastic reaction of the rail from the longitudinal strain set up in it by the impact of the wheels, but that would require a continuous rail. That strain cannot be determined; it is entirely distinct from the bending and shearing strains caused by the vertical components of the wheel loads.

But practically the creeping of jointed rails can be very much retarded by several means.

First, by having the track smooth and rigid, which will reduce the rebounding of the wheels and therefore the number and force of glancing blows.

Then, as continuous rails are not feasible on steam railroads, whatever may be done in this respect on street railroads, the next best thing are long rails on a continuous foundation. There is no good reason why they should be less than 60 ft. long. The reasons against long rails on cross ties cannot be urged against them on the steel sleeper system. The number of joints being only one-half of those for 30 ft. length, the number of blows at end of rail will also be only one-half in that length. The greater number of holding-down bolts will offer greater resistance to sliding on the bearings for each individual rail.

The holding power of a hard driven spike in oak is about 5,000 lbs., and only half of that in softer woods. It is evident that with wheel loads of 10,000 to 25,000 lbs. pressing the rail down to the elastic wooden tie, the two spikes holding it are relieved of duty (except that of keeping the rails to gage on curves). As the wheel passes off, the rebounding rails strike the spikes with an upward blow, loosening them, so they must be redriven from time to time. Such fastenings are worthless for holding a rail; they oppose very little or no friction to creeping.

In the system here discussed the tension in the two track bolts at each bearing is 12,000 lbs., sufficient to hold the rail down with about 6,000 lbs. At the rail joints the holding down force of the two vertical bolts is not less than the load upon a driving wheel, or about 25,000 lbs. An unloaded rail 60 ft. long on 30 bearings will thus be held down through the bolts by about 200,000 lbs. For a coefficient of friction of 0.25 the resistance to creeping will be (from the friction on top and bottom surfaces of the clamped rail base) $2 \times 0.25 \times 200,000 = 100,000$ lbs. per rail. It would only be 50,000 lbs. for a 30-ft. rail. To produce the same friction for loaded rails, held by loosened spikes on the elastic wooden ties, would require the impossible train load of 13,400 lbs. per lineal foot of track.

Numerous and strong holding-down bolts and long rails are, therefore, the most efficient remedy against creeping—a remedy which cannot be had on spiked tracks.

A further retardation will occur through the elastic resistance of the iron cross ties on top of the bulb angles to bending in the direction of the train; they will absorb a considerable part of the longitudinal strain from the rail.

All the named resistances combined will probably suffice to prevent creeping on the continuous steel-sleeper foundations.

The rate of creeping on wooden ties differs greatly, from $\frac{1}{2}$ in. to 20 in. per year, according to ton mileage, other things being equal. But excessive creeping occurs on certain kinds of bridges from static forces; particularly on arch bridges, high trestles and on shallow trusses with high camber. All these are subject to lengthwise yielding in the direction of the train. The rails are pushed over the piers or abutments, where they are held pinned down by the weight of the moving train, while the structure itself recedes from under the rail to its normal position. The creeping from that cause is sometimes greater than that from the rolling friction of wheels. It amounts, for instance, to 12 in. per day on each track of the St. Louis arch bridge, in the direction of traffic; and bridges with several inches of creeping per day are numerous. On rigid bridge structures the rate of creeping will be no greater than for open track. Every bridge structure can certainly be designed to prevent creeping from static loads if pains are taken to provide against it in the first place. To do so after a structure is built is very difficult and sometimes impossible.

VIII.

The maintenance of switches, frogs and track crossings is more expensive than that of the open track, and to reduce that expense greatest attention must also be given here to the track foundation.

As regards track crossings, they should always be made of hard cast steel in deep and heavy sections, laid on a durable and solid steel and concrete foundation. The first cost over the usual riveted constructions will be much greater, but it is true economy by reason of the greatly reduced expense for repairs and renewals, and of augmented safety of operation.

For switches and frogs the longitudinal sleeper system is not suitable, because of the too great variation of pieces and details it would require. A very superior construction for them can, however, be obtained with steel cross ties, imbedded in concrete. The ties should be 8 in. deep, weigh 25 lbs. per lin. ft. and be spaced 20 in. on centers. The concrete should be 6 in. thick under the ties and reach within 3 in. of their tops. A solid foundation of concrete is here justified, to keep the water out and to drain off the surface more certainly.

The form of the tie is shown in Figs. 8 and 9. The slot in the top permits of fastening the rails, frogs and other track pieces wherever and at whatever angle they happen to rest on them, with the same facility as on wooden cross ties. The fastening down is

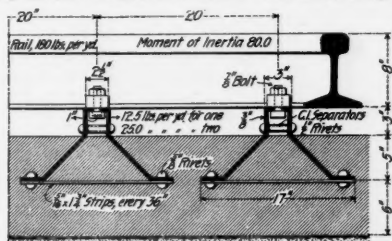


Fig. 8.

Steel Cross Ties for Switches.

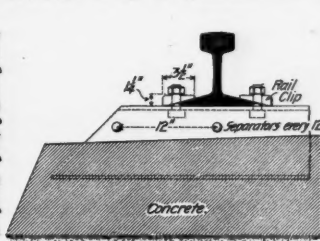


Fig. 9.

The smaller wear and tear on the rolling stock and the smaller risk of accidents, are additional economies which in themselves would make it worth while to construct the switches of large passenger stations of the most substantial character.

Where the 180-lb. rails of the switches join the 30-lb. rail of the open track, which is where the cross tie foundation joins that of the sleepers, a strong

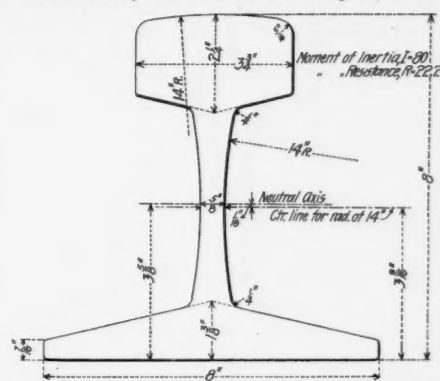


Fig. 12—Design for 180-lb. Rail.—Lindenthal.

rail connection can readily be made on a special steel casting, to which the rail ends are anchored down.

[TO BE CONTINUED.]

Lord Rosebery on American Railroad Presidents.

Recently there was a grand celebration on the Caledonian Railway, it being the fourth annual excursion of the employees at St. Rollox. At a dinner of the officers and guests Lord Rosebery presided and in proposing the toast of the "Railway Interests of the United Kingdom," he took occasion to say something worth quoting about the Presidents of the American railroads:

"I used," he said, "at one time of my life to be very often in America, and I used to endeavor—what I would recognize now as a futile endeavor—to carry out a sort of parallel in my mind between the institutions of Great Britain and the institutions of the United States, which are in some degree derived from those of Great Britain. I was very hard put to it to find an aristocracy in the United States; they don't like an aristocracy in the United States; they don't mind a plutocracy, but they don't like an aristocracy. But to my great relief I found there was an aristocracy in America, and an aristocracy so exalted that the highest of our peerage here could hardly compare with them. I refer to the railway presidents of the United States. I came to the conclusion after much study and with much gratification—for I experienced much kindness at their hands—that an American railway president was a little more than the equivalent of an English duke. They have a power which seems to the observer almost despotic. They travel in a style and in private chariots to which no English duke could aspire. They have, in fact, a position in the enormous corporations which they control which is, so far as I know, unparalleled in this country. Well, that is a strange fact, and I don't remember having seen it observed before. But I think the more you examine the case the more you will find that what I state is accurate. But even then, as a Briton, I prefer our British form of directorate and chairman. Humble and democratic as my

taste may be, I prefer a chairman like my friend Mr. Bunten, who comes here to accept the hospitality of the employees, to the most despotic and autocratic president that can be found in any other community in the world."

Record Discipline on the Southern Pacific.

Brown's discipline, or the abolition of suspensions, went into effect on the Southern Pacific (Pacific system) in August, 1896, and it has now been in use on the other lines of that company for about two years. All of the superintendents, including those who were at first skeptical, are now heartily in favor of the system. Vice-President Julius Kruttschnitt has sent us the last semi-annual statement of the results of the discipline on the three grand divisions of the company's lines, from which we extract the following data:

Table No. 1.—Discipline on Southern Pacific. Half Year Ending with June, '99, Dec., '98, June, '98.			
Employees subject to record			
Discipline	9,534	9,607	8,883
Percentage with clean record	84.0	86.5	86.2
Percentage commended	3.5	2.7	1.7
Percentage disciplined	16.0	13.5	13.8
Wages saved	\$60,732	\$51,330	\$43,985

The number of employees disciplined in the last

half year was 1,561. Of these, 136 were reprimanded, 1,217 were "suspended by record," from five to 60 days each, and 208 were discharged. The details of this discipline are shown in table No. 2, which we give in full.

A review of the principal causes of discharge shows that in the last half year, out of every 1,000 employees subject to discipline by record, 7.7 were discharged for intemperance; 2.3 for insubordination; 2.7 for overlooking train orders; 2.4 for improper train handling; 2.9 for other neglect of duty; 1.6 for failure to report for duty, and about 2.1 for other causes.

On the Southern Pacific a demerit of 30 days is wiped out by a clear record for 12 months. Mr. Kruttschnitt, commenting on the liberal regulation recently adopted on the Long Island road, says that all of the Southern Pacific superintendents believe

"Sprinkled with Oil," were read and laid over for discussion at another time. Article five, Section one, of the Constitution was amended by eliminating the words "or special."

The second meeting was called to order Tuesday, at 8 o'clock P. M., and the third session at 9 o'clock Wednesday morning.

The entertainment programme was very elaborate. Wednesday afternoon was given up to a steamboat trip among the islands of Portland Harbor and Casco Bay, through the courtesy of the Casco Bay Steamboat Co. In the evening of the same day an address on "The Proper Organization of the Maintenance of Way Forces" was made by Mr. E. E. R. Tratman. On Thursday, by courtesy of the Maine Central, Portland & Rumford Falls and Rumford Falls & Rangeley Lakes roads, the members and guests were taken by special train for a trip through the Range-

Table No. 2.—Southern Pacific Discipline.

	Reprimanded.	Suspended by Record (Days.)								Discharged.	Total, 6 months ending		
		5	10	15	20	30	40	50	60		June 30, 1899.	Dec. 31, 1899.	June 30, 1898.
Intemperance.....	73	0	0	1	0	0	0	0	0	73	74	68	58
Insubordination.....	22	0	0	1	1	3	0	0	0	22	31	35	42
Improper train dispatching.....	1	0	1	0	0	1	0	0	0	1	4	10	6
Overlooking train orders.....	26	1	1	1	2	7	0	0	20	26	58	48	55
Failure to give or obey signals.....	4	0	29	15	11	7	0	0	4	2	72	40	41
Negligence causing damage to property:													
Improper train handling.....	26	2	117	44	16	35	2	1	8	23	274	305	234
Other.....	5	2	73	13	9	18	2	0	1	7	130	199	190
Other negligence and neglect of duty.....	51	43	215	59	17	53	0	0	4	28	470	351	447
Failure to report for duty.....	6	1	114	16	13	4	0	0	0	15	169	111	102
Failure to report accidents.....	15	0	13	2	1	0	0	0	0	0	17	30	5
Carelessness in making reports.....	21	0	35	3	2	3	0	0	0	0	39	30	19
Improper billing and handling of freight.....	4	0	72	21	5	5	0	0	0	0	124	52	45
Carrying freight over or short of destination.....	0	0	25	15	8	0	0	0	0	0	52	18	24
Carrying passengers without leave or without proper transportation.....	0	9	1	1	2	2	0	0	2	7	24	18	18
Inconvivility to patrons.....	0	0	0	0	0	0	0	0	0	0	0	5	2
Dishonesty.....	0	0	0	0	0	0	0	0	0	3	3	5	2
Services unsatisfactory.....	0	0	0	0	0	0	0	0	0	0	0	1	2
Total, 6 months ending June 30, 1899.....	136	58	696	192	87	138	4	1	41	208	1,561
" " " " Dec. 31, 1899.....	187	29	560	160	75	135	10	0	23	184	1,326
" " " " June 30, 1898.....	237	82	378	138	51	124	5	2	37	215	1,292

that their own rule is perfectly satisfactory. An officer of the Rock Island road gives similar testimony concerning the rule in force on that road.

The rules regulating this matter on a number of roads are as follows: On the Louisville & Nashville a suspension of 15 days is cancelled by a perfect record for one year. On the Chicago, Rock Island & Pacific a demerit of 20 days is cancelled by one year; no credit will be allowed for less than 12 months' consecutive service. On the Wabash a suspension of 10 days is cancelled by a clear record of six months. On the Southern Pacific the shortest clear record for which a credit is given is six months. On the Northern Pacific a suspension of five days is cancelled by three months. On the Atchison, Topeka & Santa Fe six months cancels 10 days. On the Long Island six months secures two credits and one of these credits cancels 10 days. On the basis of one year, these different rules may be compared as follows:

A perfect record for one year on the	
Louisville & Nashville cancels demerits = 15 days.	
Chicago, R. I. & Pac. " " = 20 "	
Wabash " " = 30 "	
Southern Pacific " " = 30 "	
Northern Pacific " " = 30 "	
Atchison, T. & S. F. " " = 30 "	
Long Island " " = 80 "	

Eastern Maintenance of Way Association.

The annual convention of the Eastern Maintenance of Way Association, formerly the New England Road Masters' Association, was held at the new Falmouth Hotel, Portland, Me., Sept. 25-29. The first meeting was called to order by President Torr at 2 o'clock Tuesday afternoon.

A short address by the President was followed by the reading by Secretary Stowell of the minutes of the last annual meeting, and of subsequent executive committee meetings. The report of the Secretary and Treasurer showed a balance on hand Sept. 26, 1899, of \$237.89. Twenty-two members answered the roll call.

The following new members were elected: W. G. Berg, E. M. W., L. V. RR.; Henry Ware, R. M., B., R. & P. RR.; E. Laas, C. M. & St. P. RR.; H. W. Hayes, A. E., Fitchburg RR.; A. K. Downes, A. R. M., Maine Central RR., and C. A. Sibley, Supervisor, N. Y., N. H. & H. RR.

The following officers were elected: President, E. A. Haskell, R. M., Boston & Albany, and Vice-President, F. E. Sibley, R. M., New York, New Haven & Hartford. The new Executive Committee consists of John Patch, B. & M.; M. C. Hamilton, N. Y., N. H. & H.; W. E. Tuttle, N. Y., N. H. & H. RR., and C. H. Pemberton, B. & M., with the officers of the Association. F. C. Stowell was re-elected Secretary and Treasurer.

Committee Reports on the subjects: "How Shall the Right of Way Be Maintained in a Tidy Manner with the Least Labor of Trackmen"; "The Most Efficient, Durable and Economical for Standard Snow Fence; Also Best Form of Wire Right-of-Way Fence, Giving Size of Wires, Etc."; and "From a Maintenance-of-Way Standpoint, the Consideration of the Relative Merits of Stone Ballast or Gravel

ley Lakes. For Friday a trip by special train was made over the Maine Central through Crawford Notch and the White Mountains to Fabyans.

REPORTS OF COMMITTEES.

Snow and Wire Fences.

Snow Fences.—Where the right of way is sufficiently wide, we recommend a close board fence, height varying according to the snowfall. Where the right of way is narrow and there are many shallow cuts, which are filled with drifting snow, a portable fence may be made in about twelve-foot lengths to bolt together. The permission of the adjoining property owners having been obtained, these panels should be set up about 100 feet from the track and parallel thereto, and they will cause the drifts to form entirely outside the right of way. When snow has accumulated to the top of the fence, the fence may be placed on top of the drift which is already formed, and the process goes on the same as before. (Photographs of this kind of fence were shown at the convention.)

Wire Fence.—Your Committee would recommend a woven wire fence instead of barbed in all places where a wire fence is adapted. As the size of the wire depends upon the service the fence is called upon to perform, the details should be left to the manufacturers.

A. C. Stickney.

Stone Ballast or Gravel Sprinkled with Oil.

Your Committee are undecided what constitutes an answer to this question, but will endeavor to show the merits as they understand them of the two kinds of ballast. Trap rock broken so as to pass through a two-inch mesh is now used quite extensively on some roads and gives general satisfaction. Your Committee would recommend at least twelve inches in depth, under the tie; this prevents frost from having any bad effect on the track, maintains a good surface, is free from dust and is porous, so rain does not affect it materially.

Gravel sprinkled with oil was introduced for the purpose of laying the dust, which it does very effectively. It prevents grass from growing and preserves the life of the ties from one to two years. Gravel sprinkled with oil has all the essential qualities of stone ballast, and it is possible to make and to maintain a more even surface than with stone with the same amount of labor. Committee: T. J. Sullivan, F. E. Cibley, J. Maher.

A Tidy Right-of-Way.

Uniformity of practice is a desirable feature and a potent factor. We recommend that standards be decided on and adopted of the various details within the location lines, including cross-section of roadbed, sod line distance from rail, shape and color of all signs and distance to be set from track, style of right-of-way fencing, etc. A systematic method of procedure should be established for getting the different kinds of work done seasonably and at the proper time relative to each other. Material should be provided in ample season and the proper working force furnished for carrying on the work in this regular and systematic manner.

Employees of transportation and motive power departments should be governed by rules tending to impress upon them the necessity of doing their part toward keeping the roadbed clear. Under this head might be mentioned disposition of station and train rubbish, locomotive ashes, waste, etc.

All foremen to be encouraged to take pride in the condition and appearance of the roadbed, and they should understand that a neat and tidy appearance would be substantially appreciated. Committee: R. A. McQuail, George A. DeMoore, G. L. R. French.

Exhibits.

The exhibits were shown in a room in the hotel near the place of meeting. The following is a complete list:

American Steel & Wire Co., Chicago, Ill.—Railroad fencing.

Buda Foundry & Mfg. Co., Harvey, Ill.—Buda hand car, track drills, track gages, steel wheels for light cars, Ware tie plate surfaces and gage, angle bar straighteners and a full line of general track supplies.

Clinton Wire Cloth Co., Clinton, Mass.—Samples of Clinton electrically welded railroad fencing.

Continuous Rail Joint Co. of America, Newark, N. J.—Several sections of track, showing application of the Continuous joint, one section being fitted with the new extension base, which provides for a confined spike slot and gives about 25 per cent. more tie bearing surface than the previous form of Continuous joint.

Dilworth, Porter & Co., Pittsburgh, Pa.—The Goldie

Perfect Point spike, in soft steel; the Goldie shoulder claw tie plate and the Glendon tie plate.

Fairbanks, Morse & Co., Chicago, Ill.—The exhibit of this company was very complete and was the largest of the convention. It included two Sheffield hand cars, four (single and double) Sheffield velocipede cars, gasoline motor car, steel cattle guard, duplex track level, pressed steel track gage, set of pressed steel foot guards, McHenry track level and track gage, Barrett jacks, model of the Sheffield hand car and blueprints showing water stations, gasoline engines and air compressors.

William Goldie, Jr., & Co., Pittsburgh, Pa.—Samples of the Goldie tie plug.

Hussey, Binns & Co., Pittsburgh, Pa.—Scoops and shovels.

William T. Manning, Baltimore, Md.—Sections of the Manning improved rail.

National Lock Washer Co., Newark, N. J.—Samples of the National lock washer.

Page Woven Wire Fence Co., Adrian, Mich.—Section of Page wire fence as used by the Lake Shore & Michigan Southern.

Pearson Jack Co., Boston, Mass.—Full-size and models of the Pearson car replacing jack and Pearson king-bolt clamp.

Ramapo Iron Works, Hillburn, N. Y.—Model of a section of track showing the Ramapo automatic switch and stand.

Roberts, Thorp & Co., Three Rivers, Mich.—Hand and push cars and steel wheel for light cars, the last-named being illustrated in a recent issue of the Railroad Gazette.

Rodger Ballast Car Co., Chicago, Ill.—Model of Rodger ballast car.

Sherburne & Co., Boston, Mass., agents for Verona Tool Works of Pittsburgh, Pa., and Roberts, Thorp & Co. of Three Rivers, Mich.—Full line of solid steel track tools, improved rail bender, track jacks, track gages and level boards and Cyrus-Roberts hand and push cars and steel wheel for light cars.

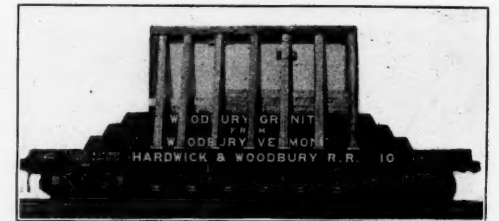
United States Car Moving Device Co., Lowell, Mass.—Patent device for moving cars.

Weber Railway Joint Mfg. Co., New York City.—Full-size Weber standard, step and insulated joints applied to sections of track.

Special Stone Car of the Hardwick & Woodbury.

General Manager E. H. Blossom, of the Hardwick & Woodbury Railroad, has sent us a brief description of a special car recently made for that road by the Laconia Car Co., for carrying a block of granite 13 ft. 1 in. x 17 ft. and 18 in. thick. This block, unlike similar pieces heretofore carried on cars, had no hole in the center and therefore had to be wholly supported at the bottom. It was made for the top of a mausoleum and weighed about 20 tons.

To carry this block a 36 ft. platform car was built, with an opening or cradle in the center, depressed sufficiently to hold the stone, standing edgewise, in



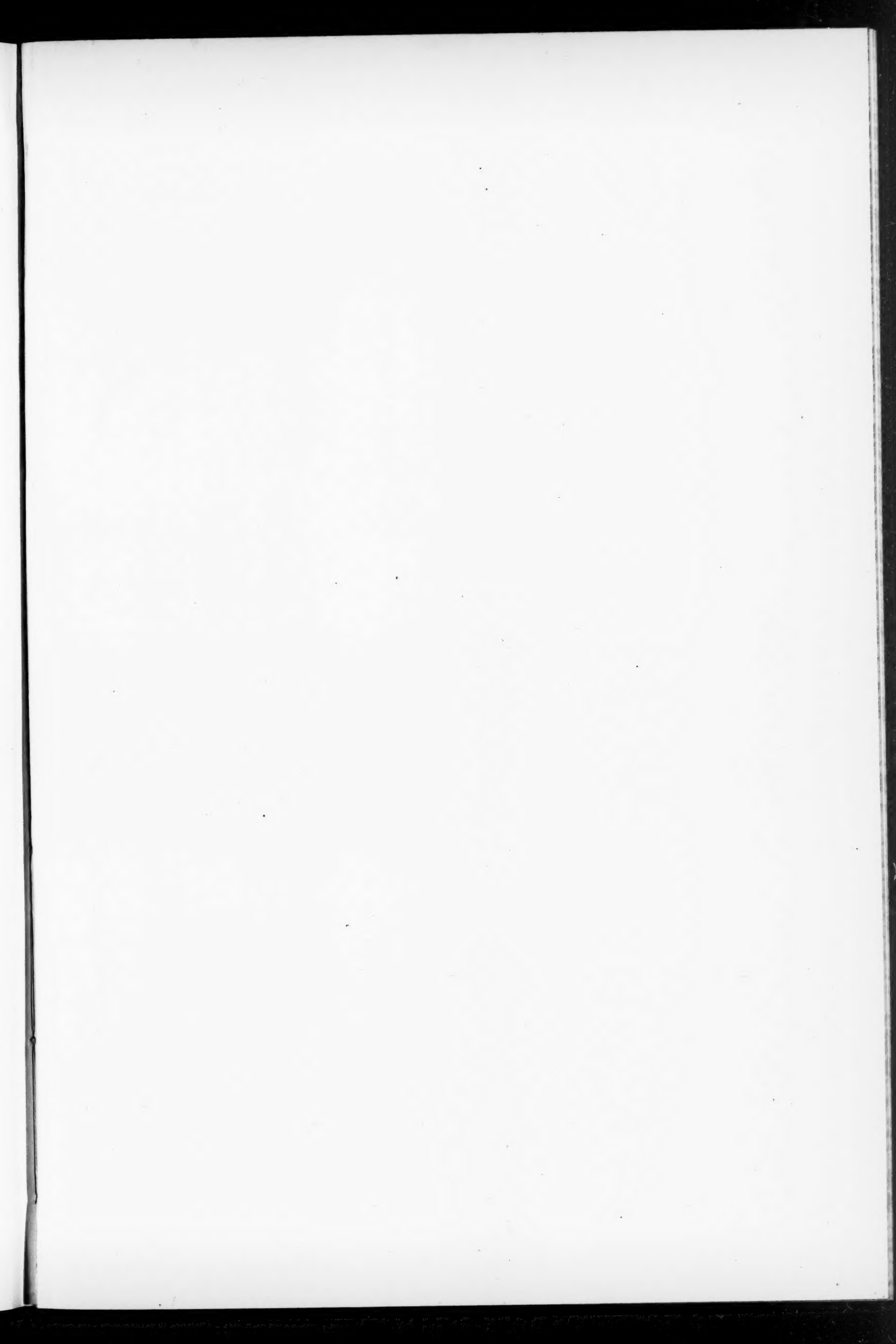
Special Car for a Large Stone.

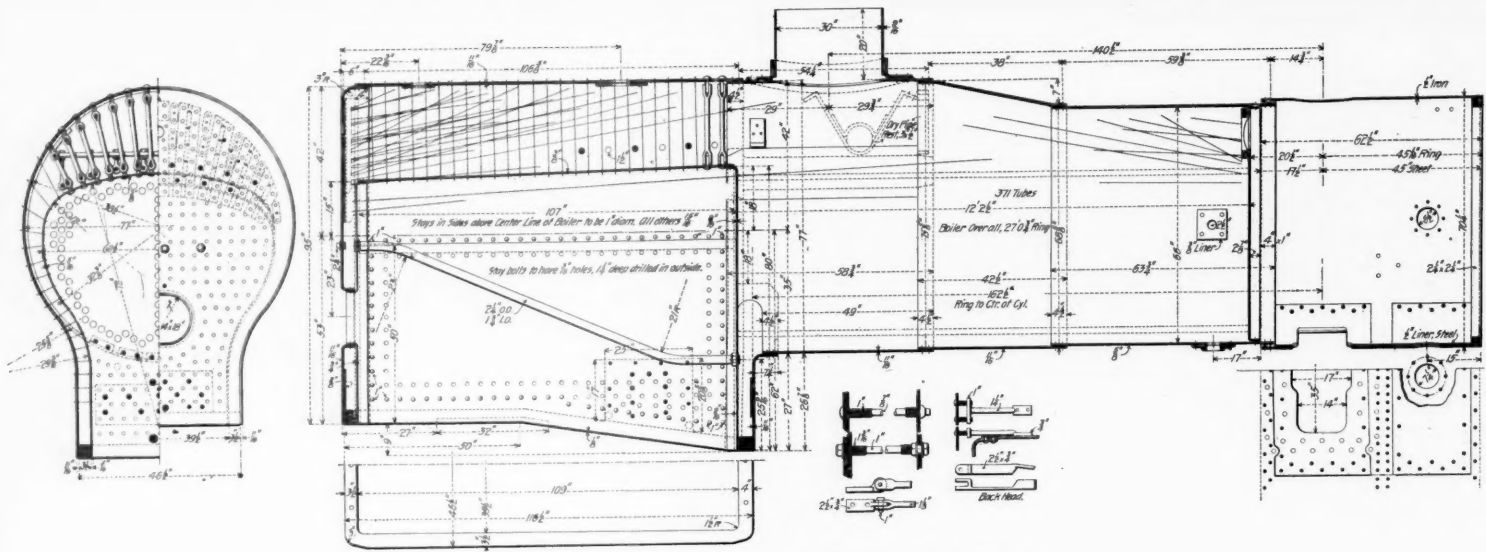
a position low enough to pass under overhead bridges. The opening in the middle of the car is 20 ft. long and 4 ft. wide. On each side of the opening are three longitudinal timbers, one above the other, each 12 in. square; and running through these timbers are 12 vertical rods, six on each side, each 1½ in. in diameter, reaching down to within eight inches of the level of the tops of the rails. Supported by these rods at the bottom are six transverse oak pieces 4 in. x 6 in. These, suitably trussed with iron rods, form the floor for the load. The upper part of the block was braced on each side by seven timbers, the lower ends of which were fastened to the outer edges of the floor of the car. The car and load made a successful run from St. Johnsbury, Vt., to Chicago, in five days.

Improvements on the Illinois Central near New Orleans.

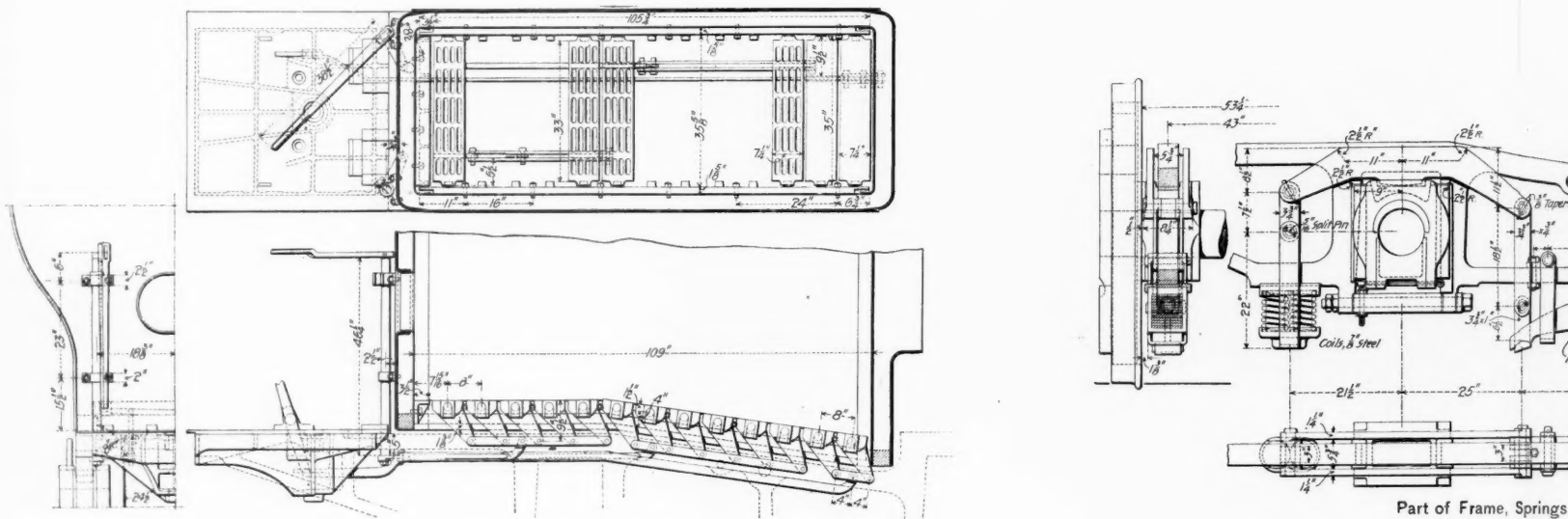
From time to time references have been made to improvements in the terminal facilities of the Illinois Central at New Orleans, and in this issue is shown the arrangement of a new yard near that point which, when finished, practically completes a very elaborate scheme for handling a large grain and other export traffic. A brief statement of the earlier work may not be out of place before describing the yard.

This road now has four modern grain elevators in and about New Orleans. Two are at Southport, a station on the Mississippi River about four miles above the city, and these together have a capacity of 500,000 bushels of grain; 150 cars a day can be unloaded at this point and two vessels alongside the docks can be loaded directly from the elevators at the same time. The third elevator is on Poydras Street, in the business district of New Orleans, and has a capacity for 250,000 bushels. It has only railroad connections and is used especially as a cleaning house, being fitted with apparatus for drying and cooling 20,000 bushels of corn in ten hours, and has oat clippers, separators and other machinery for improving "off grade" grain which must be kept out of the export elevators. But by far the largest and most important elevator in the South is the one at



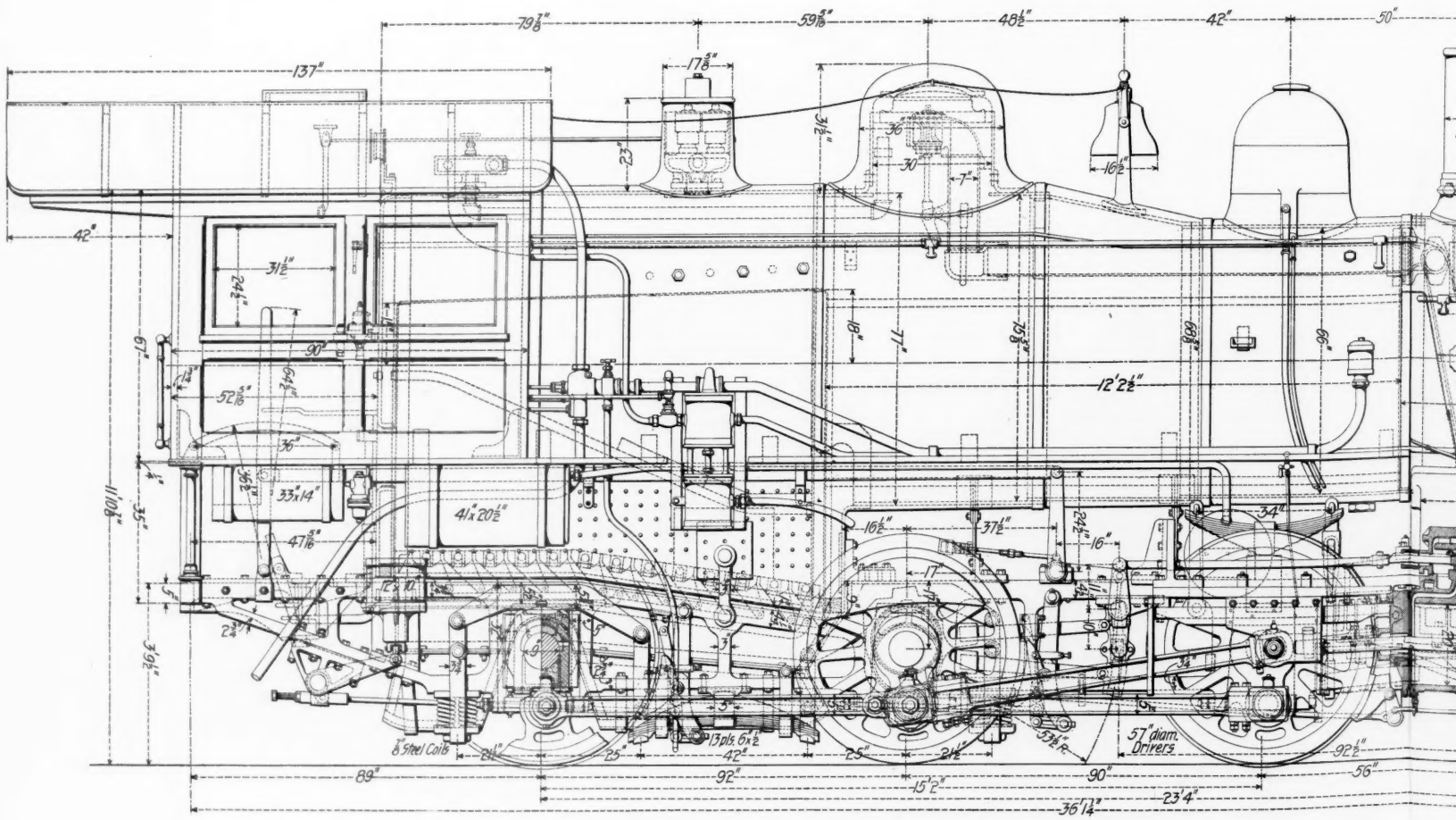


Elevation and Sections of Radial Stay, Wagon Top Boiler, Class P Mogul.



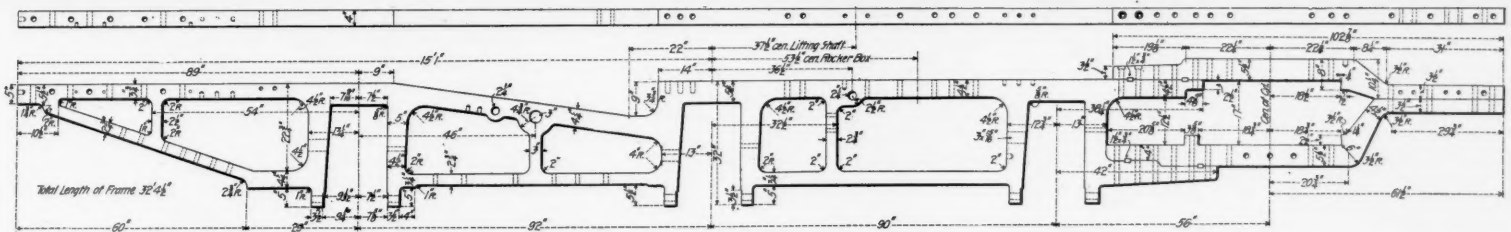
Grate Arrangement—Showing Device for Shaking

Part of Frame, Springs

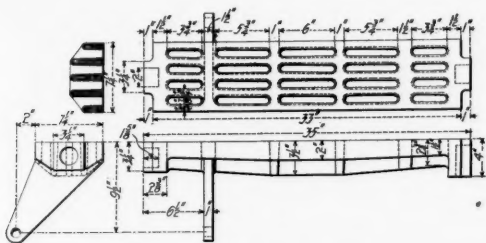


Elevation of Class P Mogul Freight Locomotive.

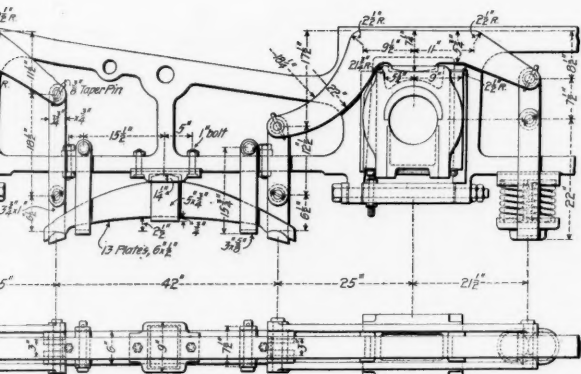
CLASS P MOGUL FREIGHT LOCOMOTIVE, 1898 DESIGN—



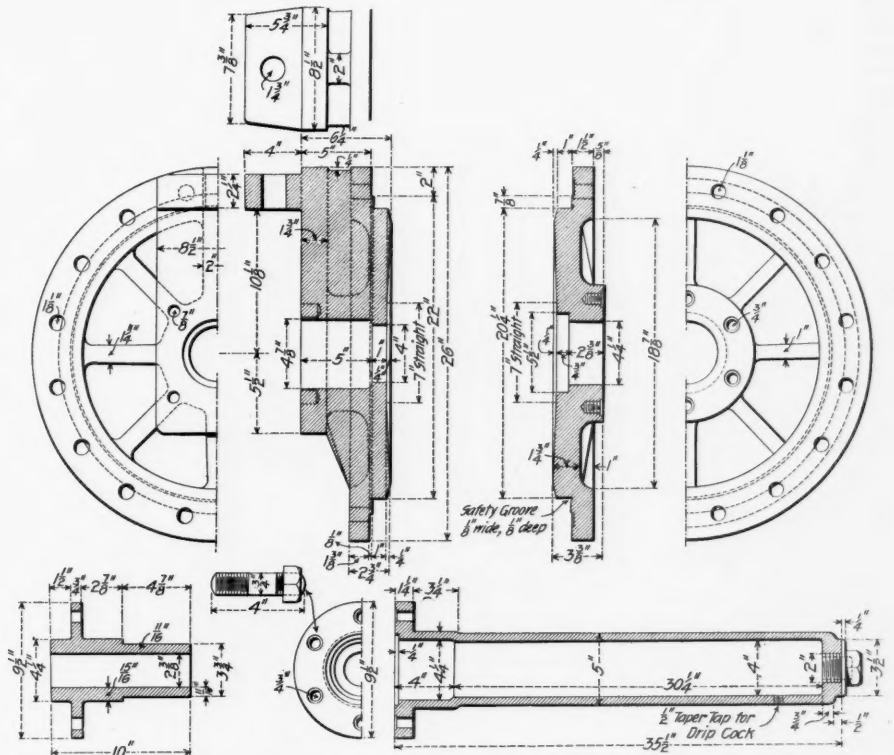
Frame for Mogul Freight Locomotive.



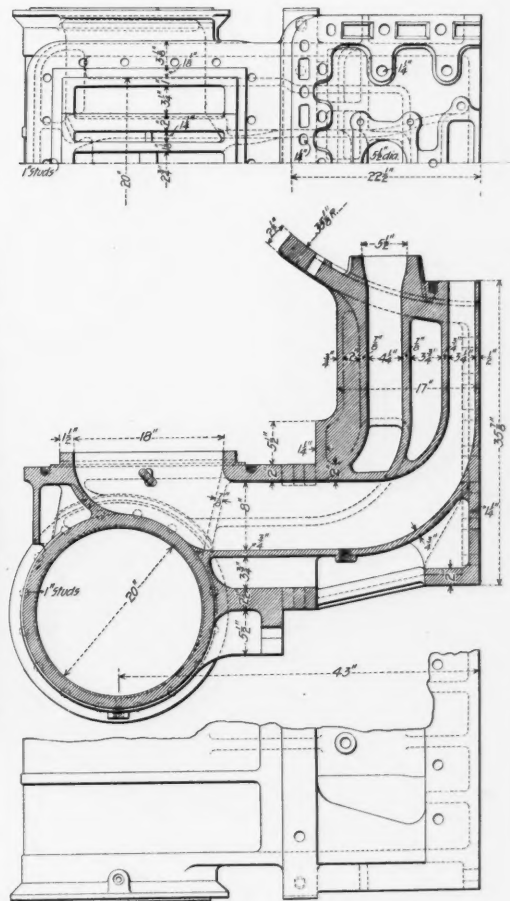
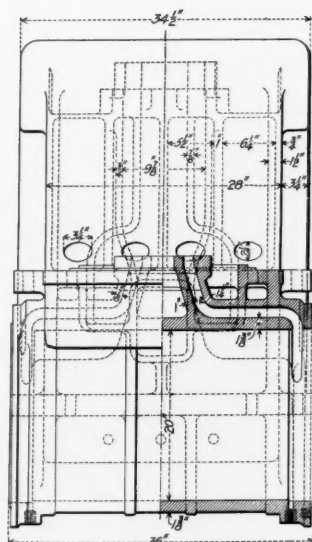
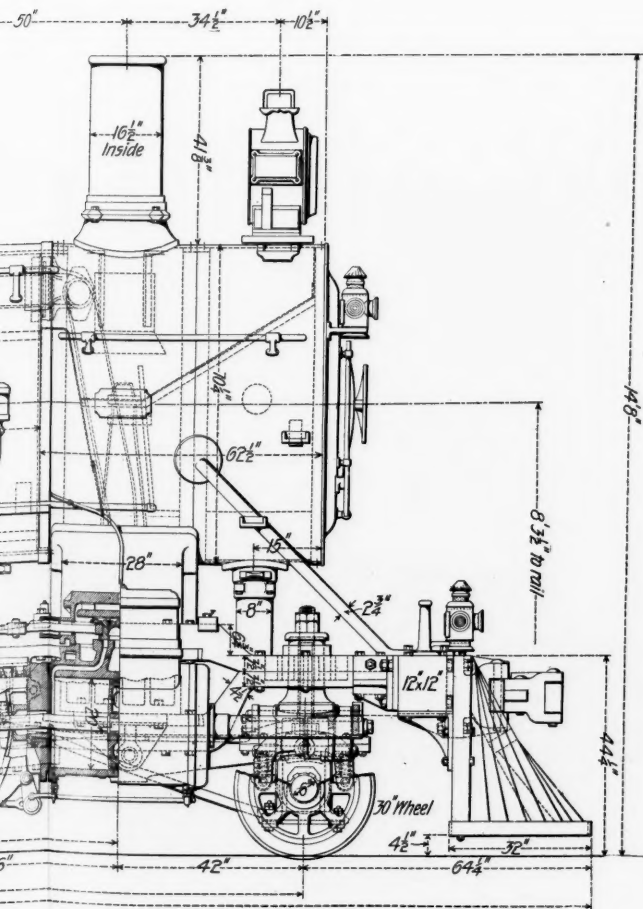
One of the Grate Sections.



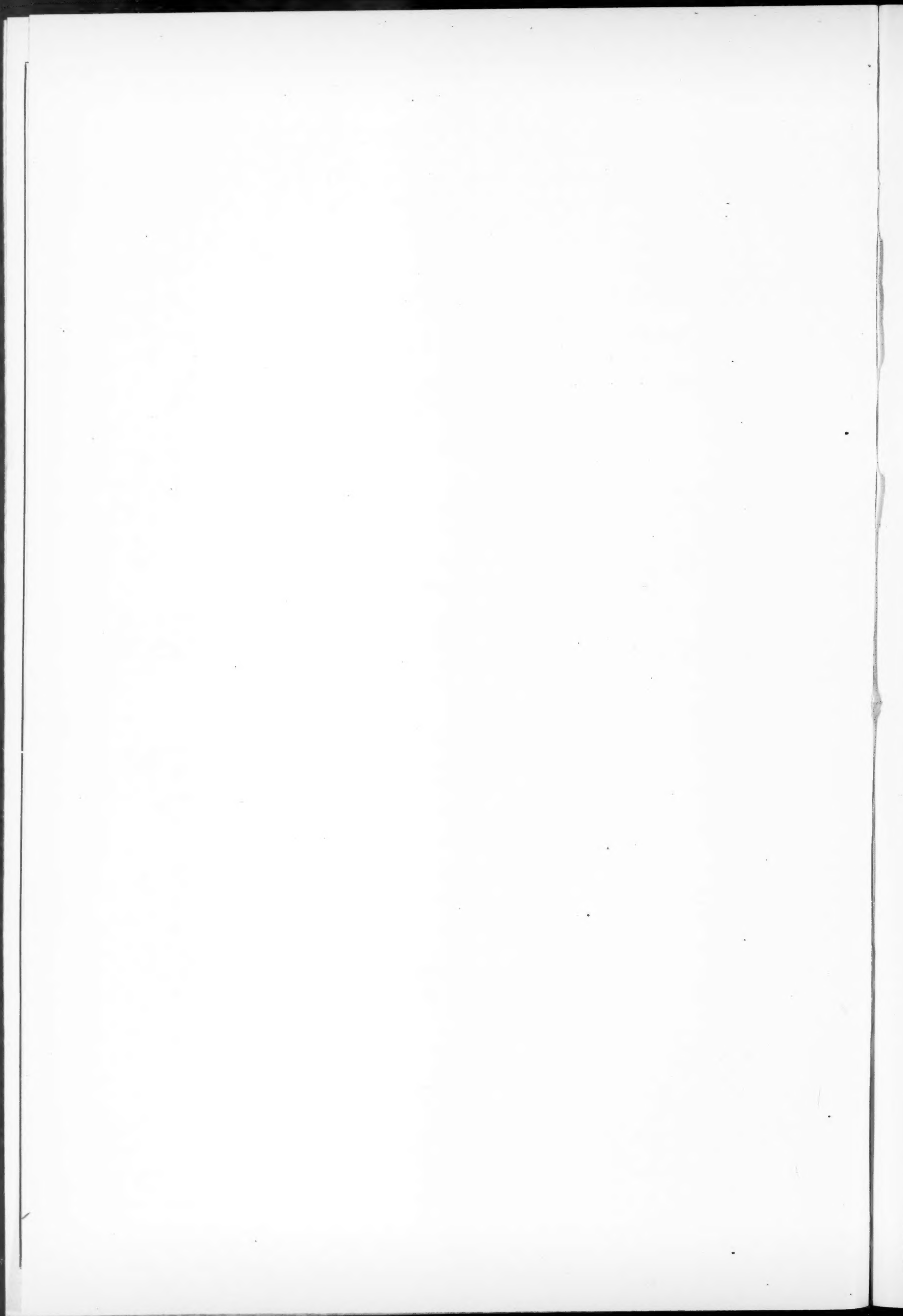
Frame, Springs and Driving Boxes.



Front End of Cylinder and Extended Piston Rod Casing.



Sections of Saddle and Cylinder.



the Stuyvesant docks at the foot of Louisiana Avenue, which is of 1,000,000 bushels capacity. The adjoining dock is 2,100 ft. long and 100 ft. wide, and by conveyors, four vessels of the largest size can be loaded with grain out of the elevator while taking on a miscellaneous cargo from the dock. At this point 35 cars an hour can be unloaded into the elevator at the same time that vessels are loading. It is readily seen that to prevent congestion at the end of the road during the busy season exceptional yard facilities are needed, and the new gravity yard at Harahan, nine miles above the city, has been carefully planned to meet these conditions.

Referring to the accompanying engraving it should first be noted that the scale is quite small and is also distorted, the horizontal scale being less than half that of the vertical scale. A general notion of the size of this yard is got when it is known that from the main tracks directly south to the Belt Line is about 2½ miles, while east and west the yard will be, when completed, fully ¼ mile across. For the

more undulating, and at 350 miles commences a mountain range which extends all the way to Lake Baikal and beyond.

From accounts recently published by K. P. Lasarew and F. P. Romanow, it appears that the principal locomotive and car shops on the West Siberian division are located at Omsk. The shop floor area aggregates 11,400 square yards. The buildings are of stone and brick with tin roof. The main shops are steam heated and lighted by electricity. A number of machines are driven by independent electric motors. There are four engine houses with nine stalls each along the division, besides the round house at Tschengjabinisk, which has six stalls, and a few smaller ones shown on the diagram. The engine houses are located about 175 miles apart, that being at present considered the proper length for locomotive runs. Four small car repair shops are also scattered along the division at approximately the same distances, but not at the same points as the engine houses, the object being to distribute the forces of the road as

masonry, frame stations by brick structures, etc. The decree also includes the re-laying of the whole line, from the Ural Mountains to the sea, with 80-lb. steel in place of the 60-lb. rails so far used.

Accounts recently published in European journals indicate that the line will have to be made ready for more traffic without delay, the amount of business coming to the road being much greater than had been expected.

Smoke Prevention and Boiler Rating.

The Proceedings of the Engineers' Society of Western Pennsylvania, just issued, contains the recommendations of the committee on smoke prevention appointed some months ago mainly to furnish a rule for the rating of boilers. The committee has gone quite carefully into the subject, collecting information and data from makers of boilers and automatic stokers, besides consulting with experienced engineers.

In the matter of rating of steam producing plants, the following three divisions were discussed: (1) Heating surface per horse power; (2) grate surface per horse power, and (3) amount of draft. The committee did not think it wise to recommend any fixed amount of heating surface per h. p., partly because some boilers are working economically with less than the usual surface usually recommended per h. p.; that is, for a horizontal tubular 12 sq. ft., and for water tubular 10 sq. ft.

In regard to the area of grate surface per horse power, the committee recommends the following: (1) Run of mine, ½ to ¾ sq. ft. per h. p.; (2) slack, bituminous anthracite, ¼ to ½ sq. ft. per h. p., the air space in the grate being taken at 50 per cent. For mechanical stoking the rate should be the same.

Regarding the third matter the committee finds that in all cases the draft should be measured not in the stack nor in the ash pit, but in the furnace over the fire and with the furnace door closed and the ash pit door open when working the grate at the above mentioned rate. When thus measured in unfavorable weather the minimum should be ¾ of an inch for run of mine and ½ inch for slack.

Regarding smoke prevention the committee reached the following conclusions:

1. In an ordinary furnace, smoke may be made very light by very careful hand firing, yet in practice this cannot be obtained continuously, and the use of special furnaces or appliances should be insisted on and made compulsory by law.

2. The best method of preventing smoke is to burn the fuel in a separate chamber, so that the combustion is complete before the gases touch the surface of the boiler.

3. Where this method is not practical, as in boilers already set and where there is no room, the best results are obtained by mixing the smoke, as it passes from the furnace, with heated air, the effect of which increases the temperature of the smoke as the temperature of the air increases, thus burning the smoke.

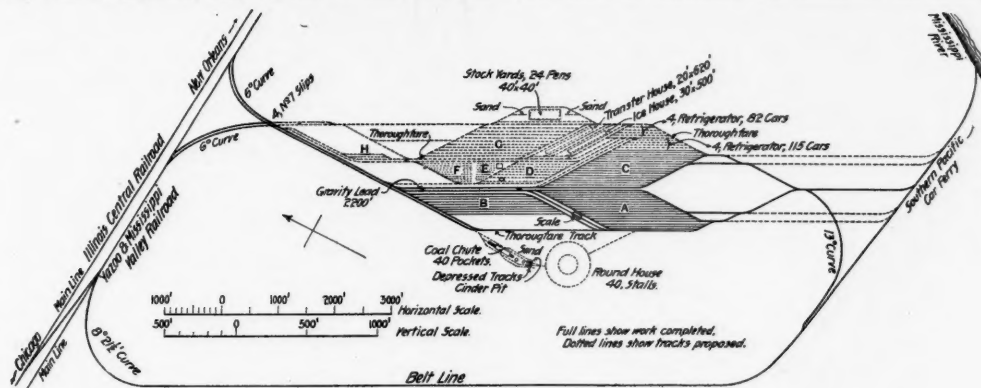
4. That as, even with special furnaces of the above types, with hand firing, the combustion is irregular and hence some smoke must be produced at times, the use of mechanical stokers is strongly recommended, especially in all plants above 100 h. p.

5. As mentioned above, there is a lower limit of grate area per h. p., below which the furnace is not heated enough to insure complete combustion and smoke is thus produced. For this reason all plants should be subdivided into two units at least, in order that the boilers may never run at a lower activity than one-third of their rated h. p.

Foreign Railroad Notes.

According to St. Petersburg newspapers the Russian Government now permits foreign corporations to run workshops, etc., under the same conditions and with the same rights as Russian companies.

On the 2d of May a notable innovation took place on the Belgian state railroad, in the discontinuance of first class passenger cars. Except on the international trains there are now in use but two classes of cars. But in order to accommodate those who wish to travel with greater comfort and convenience, the



New Gravity Yard of the Illinois Central near New Orleans

present only those tracks shown in full lines will be laid, amounting to about 28 miles, and these will be finished in time for this year's grain movement. The whole plan provides for about 48 miles of track with a capacity of 3,600 cars, a 40-stall round-house, cinder pits and coaling station complete and ice and transfer houses and stock pens.

The arrangement of the tracks, which are 13 ft. center to center, is clearly shown by the plan and needs no description. The method of working the yard when completed is in general as follows: A south bound train made up of cars for different points is first brought into the receiving yard and the road engine disconnected; there are ten tracks in this yard, each 2,000 ft. long, with a total capacity of 500 cars. The engine then goes to the round-house and the train is taken by a yard engine to the gravity leads, from which the cars are sent into the tracks of the two distributing yards, each yard holding 832 cars. These leads are on slight grades sloping downward toward the distributing yards. Cars for the same destination are thus collected on one track and made into solid trains for the levy yards, private industries, Stuyvesant docks, the river transfers or other points. It will be seen that the tracks near the ice house for refrigerator cars, those for cars in bad order and the transfer house, as well as the scale track, all lead off and are worked from the gravity leads in the same way as the distributing yards.

North bound cars will usually be brought to the receiving yards in cuts, and be passed through the distributing yards in the same way as before and then made into trains in the out-bound yard ready for the road engines. If the cars when they first reach the out-bound yard are not in proper station order, the final arrangement is quickly made by switching in what is called the "district" yard; there are ten stub tracks in this yard corresponding to the ten districts into which the road is divided. It will be seen that the caboose tracks are located at the end of the out-bound yard, and the caboose is picked up just before leaving. Until the portions shown by dotted lines are finished, the receiving and distributing yards will be used in the way described, only trains will be made up ready for the road engines in the distributing instead of in the out-bound yards.

Shops and Equipment of the Siberian Railroad.

The completed portion of the Siberian Railroad, so far opened for traffic, extends from the Ural Mountains on the European border to Lake Baikal, and is divided into two grand divisions, the West Siberian, 880 English miles long, and the Central Siberian, 1,137 miles, with a branch line of 54 miles to the city of Tomsk. The division point is at Ob, on the river of the same name. In May this year the road was opened to the lake for regular traffic, the last link, the bridge over the river Jenissei, having been completed at that time. West of the Ob the line runs through a continuous prairie land resembling the Western States in this country. The principal industry is cattle and horse ranching, with a sprinkling of agricultural settlements along the rivers. Two hundred and sixty-one bridges were necessary through this territory. East of Ob the country grows

much as possible so as to have a chain of military stations within convenient reach of each other.

The principal shop of the Central Siberian division is located at Krasnojarsk, where an aggregate area of 13,480 square yards is under roof. In addition, there are engine houses in connection with light repair shops located at five other stations, and car repair shops at the terminals, Ob and Irkutsk, also at one other point, as shown.

On the West Siberian division there are 38 water stations, and on the Central Siberian division there are 79. The water supply is taken from the rivers and from artesian wells. In connection with the wells purification plants have been established at several places, with settling and storage basins, in addition to the regular tanks.

The regular traffic consists of one mixed passenger train and two freight trains daily in each direction, but yards, stations and sidings are laid out for an emergency of seven extra military trains in each direction, daily, without interruption of the regular traffic.

The rolling stock equipment has been made up to a large extent of second-hand material from the Russian Imperial State Railroads, and appears to-day of the following compositions (West Siberian division):

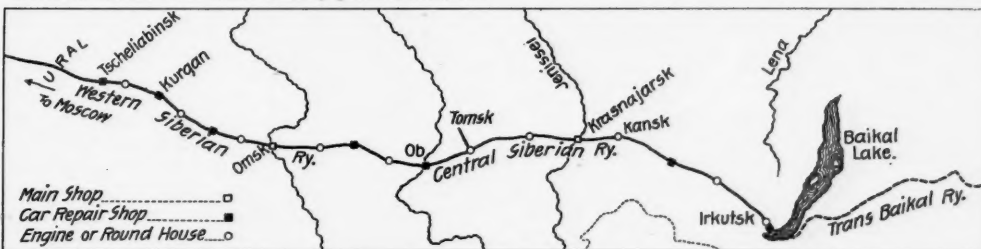
26 new 8-wheel locomotives,	127 old 6-wheel locomotives,
54 new passenger coaches,	8 old passenger coaches,
13 new baggage cars,	13 new postal cars,
13 new prison wagons,	5 special cars,
1 gospel car,	997 new covered freight cars,
	776 new open freight cars.

For the Central Siberian division the equipment is as follows:

42 new 8-wheel compound locomotives,	6 old 8-wheel locomotives,
73 new passenger coaches,	113 old 6-wheel locomotives,
17 new postal cars,	17 new baggage cars,
1,093 new covered freight cars,	15 new prison cars,
364 new open freight cars,	130 old covered freight cars,
550 ballast cars,	275 old open freight cars,
	51 new miscellaneous cars,

built at the division shop at Krasnojarsk.

The new locomotives were built by private concerns



The Finished Portion of the Siberian Railroad.

at Kolomna and Brjansk in Russia. The new passenger equipment also came from the Kolomna works, as did a large portion of the freight cars.

In February this year an imperial decree was issued to the effect that as soon as the whole remaining line from Irkutsk to the Pacific coast has been completed, the work of increasing the carrying capacity of the road will begin at once. All temporary constructions will then be replaced with permanent ones, wooden bridges will be superseded by steel and

International Sleeping Car Co. furnishes luxuriously equipped, commodious and convenient electrically lighted cars on the principal trains. To obtain a seat in one of them a passenger must pay an extra fare of about one cent a kilometer. Of the proceeds, one-half goes to the sleeping car company and one-half to the railroad. A round trip ticket can be obtained at a reduction of about 20% from the regular fare. For some time now in Belgium the rate of fare has been the same on all classes of trains.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

The "Chronicle" last week published its summing up of railroad gross and net earnings for the month of July, which is a more comprehensive and somewhat more accurate compilation than that of gross earnings published earlier. The result expressed briefly is that the increase in gross earnings over last year amounted to 18.76 per cent., or 12½ million dollars. The increase in net amounted to 25.87 per cent., or 5¼ million dollars. The editor says that "both for ratio and amount of increase the month will rank with the very best on record." The Pennsylvania System stands at the head in gain in gross and second in gain in net, both of which increases are very large. The Atchison, which is eighth in gross, leads in net with an increase of close to half a million dollars. The Philadelphia & Reading, which is second in gross, is 14th in net. The Milwaukee & St. Paul stands third in the list in gains in gross and fourth in net, which positions are exactly reversed in the case of the Burlington. The Erie is fifth in gains in gross earnings and eighth in net.

The constitution of the State of Georgia prohibits the consolidation of competing railroad corporations and declares void any contract of the kind which lessens competition or encourages monopoly; but Judge John C. Hart, of the Superior Court, has rendered a decision in what appears to have been a rather frivolous suit, which will remind the citizens of the State that all such radical enactments must be interpreted in the light of common sense, if they are to be a public benefit. The suit was brought by the Attorney General of the State at the request of citizens, to secure the nullification of the contract by which the Central of Georgia, in 1896, bought the Middle Georgia & Atlantic; but the Judge decides that the competition formerly existing between the two roads amounted to little or nothing*; that the consolidation has introduced competition where it did not exist before (at Milledgeville and Covington, between the Central of Georgia Railway and the Georgia Railroad); that the only or the chief sufferers are consignees at Shady Dale, who formerly had their freight delivered free at the store door, and freight shippers at Milledgeville, who received secret rebates in the shape of passes; and, finally, that the purchased railroad has been greatly improved in track, vehicles and service, and passenger and freight rates have been very generally reduced. The opinion of the Judge recites these several considerations at considerable length, from which it appears that the decision affords an excellent example of substantial justice, whatever flaws may be found in it by lawyers who may split hairs over technical or narrow meanings of the words of the constitution. We would suggest to the railroad commissioners of Georgia that they now take measures to get free

cartage of freight abolished everywhere, and the giving of passes to shippers, to influence freight shipments, made illegal. We judge from a perusal of the decision that the consolidation ought to have been justified, even if these improper practices had not been found; for the advantages of improved service and reduced passenger rates which resulted from the transfer of a run-down line to a strong company seem to have been very considerable; but such pass-giving is, from the traffic manager's standpoint, vicious, and free cartage of freight is a method of rate manipulation which is not only unbusinesslike in theory, but has also a constant tendency to encourage the making of secret rates at other places. The law-makers of Georgia can probably benefit the citizens of the State much more by correcting such abuses as these than by enacting prohibitions of consolidation which are so rigid that they cannot be made workable.

The Engineer as a Ruler.

We have often thought that the permanent occupation of Cuba, Porto Rico and the Philippine Islands may have one effect on the development of our nation far more important than any advancement of commerce or military power. That effect, as we judge, will be seen in the improvement of the breed of statesmen and soldiers, and through them and their experiences, and the lessons which these teach, we may look for an improvement in our internal politics. It is possible, indeed, we should say highly probable, that this will be far-and-away the most valuable result of our new policy of expansion. We are justified in this conclusion by the history of British rule in India. For generations that was often strong, sometimes feeble, and almost always corrupt and oppressive; but it has finally developed a race of soldiers and administrators who, we venture to say, stand at the head of mankind to-day in devotion and sense of duty, and in skill in organizing and force in administering. We should not be surprised to know that the Government of British India is now the purest government on the face of the earth. This is a difficult proposition to maintain, but it is at least worth thinking about.

We are led to the expression of these opinions by the receipt of the report for the year ending June 30, 1899, of the General commanding the Department of Havana and Military Governor of the City of Havana, this General being an officer of the Corps of Engineers of the U. S. Army, William Ludlow, Lieut. Colonel in the regular establishment and Brigadier General of Volunteers. He is aided by a number of skillful and devoted professional men—soldiers and army doctors—but particularly by another officer of the Corps of Engineers, Major William M. Black, who is Chief Engineer of the Department. We cannot pretend to give a summary of this document, which deserves wide circulation as a chronicle of difficulties encountered and results accomplished. All that we shall do now is to call attention to two charts.

The first of these shows the total number of deaths, month by month, in the municipality of Havana, beginning with January, 1890, and coming down to include August, 1899. In the month of October, 1898, the highest point on these curves is found. In that month 2,477 persons died, probably one in 100 of the population. In October, 1897, the deaths amounted to 2,103. From October, 1898, the curve runs down fast until May, 1899, when the number of deaths had fallen to 635. In June and July there was a slight increase and then in August the curve goes down again to 620. The death rate relative to population cannot be known for want of accurate statistics, but a census is now being prepared.

The other chart of which we speak shows the deaths from yellow fever each month in the municipality of Havana, beginning also Jan. 1, 1890, and ending with August, 1899. The maximum curve here is in 1896. In November of that year the yellow fever deaths were 460. In July, 1897, which was the maximum of that year, they were 207. The 1899 curve is the lowest one on the chart and probably the lowest that could have been plotted any time for generations back. In January the deaths from yellow fever ran down from 13 to perhaps three, as near as we can tell from the chart, and in February they seem to have touched the zero line and again in May. In August they went up to 10. The points of difference in 1899 as compared with earlier years are stated by General Ludlow as "first, the general and thorough cleansing to which the superficies of the city has been subjected; second,

the very numerous and thorough disinfections that have been made both in public and private buildings, and third, the practice of complete isolation of the patient and the disinfection or destruction of his effects."

As the reader knows, a similar struggle has been ably and successfully carried on by General Wood, another professional man, in Santiago. These are only concrete and easily exhibited examples of the kind of government that the best class of American administrators—professional soldiers, engineers and doctors—are carrying into these new provinces.

Collisions on Block-Signaled Single Track Railroads.

Two fatal collisions of passenger trains have recently occurred on single track roads which have worked under space-interval rules for several years. These roads have spent considerable sums of money to get rid of the dangers of the time-interval and flagging system, and the question will naturally arise, What are they getting for their money? The trouble, however, is not with the block system itself but that it was not complete in these cases.

One of the accidents was a rear collision and the other was butting. The rear collision was at Millers, Pa., between Corry and Meadville, on the morning of September 6. A westbound freight train took the side track to allow the fast express train, No. 5, to pass; and the express, running fast, hit the rear of the freight, the switch having been left set for the side track. The caboose and several freight cars were wrecked and four men were killed, the passenger engineman, the freight conductor, his flagman and a man on the passenger train stealing a ride. The switch that was left open was some distance east of the station, and the telegraph operator at the station had to depend on the conductor of the freight to tell him when his train had cleared the main track. It is said that this information was given by the conductor twenty minutes before the wreck occurred, and on the strength of it the operator notified the next station to the east that the track was clear for the passenger train. It is supposed that both the conductor and the flagman were asleep in the caboose.

The butting collision was at Denton, Ky., on the 2d. An eastbound and a westbound passenger train met, almost in front of the station, and both engines were killed. The eastbound train had stopped before the collision occurred. The westbound train, which should have entered the side track—the other train having the right to the main line—came on at full speed on the main track, the engineman having forgotten a telegraphic order which had been delivered to him requiring him to meet the other train at Denton. The line at this point is on a sharp curve, and therefore he did not see the opposing train until he was close to it. The block signal is opposite the station, midway of the length of the side track. The eastbound train had moved forward some distance beyond the signal, the engineman intending to send a trainman forward to set the switch so as to let the westbound train into the side track.

In the case of the rear collision the obvious deficiency was the lack of interlocking between the switch and the signal. The railroad concerned has been using and extending the block system for 10 years or more, but has had to be uncommonly careful in all its expenditures. This being so, it is not safe to say that the signaling at this particular point could justifiably have been more complete. It has been argued in the Railway Signaling Club that a road with a limited sum available for signals should provide as complete an equipment as possible, as far as it goes, even at the cost of leaving more miles of road unequipped; but the fairly satisfactory results that have been found, by many roads, during the last dozen years, from the use of incomplete blocking arrangements, indicate that there are two sides to this argument. And the use of block signals not connected with the switches is not confined to single track lines, nor to lines which do not pay dividends.

If the advocate of the time interval—or, rather, of the non-use of the space interval because of its excessive cost—were to reproach the block signal theorist on account of a collision like this, the latter could well reply that the accident would undoubtedly have happened just the same under the time-interval system. In a discussion along that line, however, the most practical point that could be made would be to remind both parties that an efficient distant signal for the switch would probably have prevented the collision under either system.

The butting collision also occurred where, as on other single track roads in this country, the block

* The Middle Georgia & Atlantic extended from Covington via Machen and Eatonton to Milledgeville. The relative situation of the two lines is well shown on the map of the Central of Georgia in the Travelers' Official Guide.

system and the old train rules are used together. In trying to sit on two stools one sometimes gets a fall. According to the standard code, the eastbound train, at Denton, could properly go forward close to the switch at which the westbound train was to enter the side track; but according to the block system, strictly administered, it should not go beyond the block signal. It is common, however, to allow passenger trains to run partly past such signals where the signal is opposite the office (following the long-standing custom with train order signals) in order to avoid the inconvenience and delay of making two stops. With enginemen thus habitually running past what should be a positive stop signal, they are liable to run a greater distance beyond than was contemplated by the rule as made. On the Baltimore & Ohio provision against a collision like that at Denton is made by a rule requiring the conductor to seasonably signal the engineman to "stop at the next station" (Standard Rule 16d). On the Cincinnati, New Orleans & Texas Pacific a special signal is prescribed for use by the conductor to distinguish meeting points from other places. This signal (Rule 93a) is two long and one short blasts of the air whistle. This is given by the conductor on approaching the side track, and the engineman acknowledges it by two short blasts of the steam whistle.

At Denton, as at Millers, a distant signal (for the block signal) would have mitigated if not prevented the collision, though the fundamental deficiency is lack of interlocking. This road, like the other, has made constant progress in equipping its line with signals and in extending the use of the block system, so that it cannot be condemned off-hand. Indeed, the use of this system on the line through Denton, which may be called a branch, recalls the fact that some roads which have spent large sums in block signaling on main lines have apparently neglected secondary lines, which, judged by the number of trains run, are of more importance than the main lines of some poorer roads where blocking has been in force for years.

The obvious conclusion to be reached from the consideration of collisions like these is that the blocking arrangements gave satisfaction as far as they were employed, and that it is regrettable that they could not have been employed more fully. The signal engineer who advises equipment of divisions has so sound a basis for his opinion that no one can say that he should abandon it. The Superintendent who has had costly collisions of freight trains on "obscure" parts of the road feels equally sure that he can make a decided saving in the expense of running his road (as well as in reputation) by employing the space-interval principle to the largest extent possible, without spending money for costly apparatus. The Manager, who has to find the money, must, of course, strive to satisfy both.

Annual Reports.

Northern Pacific.—The publication of the annual report of the Northern Pacific to June 30 last, has been delayed, but advance sheets containing the important financial changes of the year, and including the balance sheet and the income account, have been received. It need hardly be said that the company gained heavily in revenue, and that a large balance was earned over all charges and the dividends paid, the figure being \$3,210,000. It will be remembered that a reserve fund of \$3,000,000 was set aside in 1898 to guarantee the continuity, if necessary, of the regular quarterly 1 per cent. dividends on the preferred stock, until the end of 1901. The interpretation quite generally put upon this action, that dividends on the common stock might be expected in the current year, if earnings held, has been realized by the declaration of two dividends of 1 per cent. on these shares.

This payment left a balance, even after the appropriation of over \$2,000,000 for betterments, in excess of \$1,000,000. The directors have just indicated their intention of distributing an extra 1 per cent. on the common stock at the time of the next regular dividend payment. The changes in the income account for the last two years are shown in the appended table:

	1899.	1898.
Freight earnings.....	\$19,485,960	\$17,432,755
Passenger earnings.....	5,050,356	4,853,799
Gross earnings.....	26,048,674	23,679,718
Operating expenses and taxes.....	13,099,585	11,778,171
Net earnings.....	\$12,949,089	\$11,901,547
Total net income.....	13,950,607	12,788,744
Fixed charges.....	6,140,793	6,079,160
Balance.....	\$7,809,802	\$6,709,584
Dividends.....	4,000,000	3,000,000
Betterments.....	2,176,619	811,709
Surplus.....	\$1,033,283	\$2,897,875

Operating expenses increased in slightly larger ratio than gross earnings, so that the gain of 10 per cent. shown in the latter account is reduced to 8.9 per cent. in net earnings. The course of expenses on the

Northern Pacific is of special interest because, in the 1898 fiscal year, the excellent showing in net revenue was in large part due to the lower operating costs. Working expenses for the full year, in fact, absorbed only 46.6 per cent. of the gross revenue, and this exceptionally low figure was well maintained in the past year, despite the increase of 1¼ millions in the aggregate expenses, the proportion of the total being 47.4 per cent. The increase in expenses in 1899, was due, in largest part, to higher maintenance cost, the expansion being \$600,000. The increase in transportation expenses was not far from being as large, and these two accounts, as in the previous year, about equally divided the expenses. The following figures give the details of expenses, and the changes in the last two years:

	1899.	1898.	Inc. or Dec.
Main, way and struc.....	\$3,548,793	\$3,137,504	Inc. \$411,289
Maintaining equipment.....	1,914,597	1,721,765	Inc. 192,832
Conducting transportation.....	6,060,034	5,572,645	Inc. 487,389
General.....	826,028	663,456	Inc. 162,572
Total.....	\$12,349,452	\$11,095,370	Inc. \$1,254,082

The directors have been careful not only to keep up the condition of the property and equipment, but to take advantage of that prosperity to undertake extensive improvements, from which the company will benefit in decreased cost of operations. This policy really accounts for the low working cost of the past two years, and it may be said that the results in lowering operating charges so quickly and extensively, has been due to the careful system followed in expending the appropriations made available by the directors. In the days of the receivership, the operating officers and engineers had gone most systematically into the question of needed improvements, in the way of reductions of grades, heavier rails, the replacement of bridges, and light locomotives and cars, and though the \$5,000,000, then estimated as needed for such work, did not become all available under the receivers, most of it has since been put into the property, and the road has reaped the advantage in the past two years of the foresight and plans of the officers in 1895, not only in having the property improved and brought into fine condition, but in having its funds used in accordance with plans, long worked out, so that every dollar was spent to good purpose. This must be gratifying to Messrs. Kendrick and McHenry, who had much to do with formulating these plans, and are seeing them realized under their direction.

The capital charges during the year included \$1,728,176 for new equipment, \$1,360,019 for betterments, and \$598,130, the cost of the Montana and Montana Union roads. The company has been actively engaged in various new construction work, its activity in building new lines in the wheat district of the Clearwater Valley at one time threatening to bring about serious complications with the Union Pacific and Oregon Navigation Co., whose lines now occupy that territory. Such a break has been avoided by a secret agreement between the executives of the roads directly concerned. The advances made on account of the construction of this Clearwater line were \$793,883.

The Detroit & Mackinac Railroad, which advertises itself as "The Game and Fish Railroad of Michigan," gives its patrons a form of blank memorandum for recording the deer, bear, trout, grayling and bass which they may kill during the open season. The 33 sections of the Michigan game laws are printed on the blank in full. A brief summary of the restrictions on deer killing is as follows: The open season is November 8-30, and not more than five deer may be killed by any one person. No deer may be killed "in the waters of the streams, ponds, or lakes." No artificial lights and no dogs may be used in hunting. No carcasses may be shipped out of the State. A violation of the game laws is a misdemeanor, with a penalty \$10 to \$125, fine and costs, or of 30 days to six months imprisonment. All of these provisions are wise and nearly all have been found to be capable of enforcement, especially the prohibitions of hounding, jacking, water killing and the restrictions on transportation lines. The result of nearly twenty years' trial for the protection of game and the propagation of fish is that the deer are not decreasing and are probably increasing in number, and that the trout and bass fishing has improved each year, until now it is probably safe to say that the Michigan fishing open to the public is better than anywhere else in the United States west of Maine and east of the Rocky Mountains. As a commercial proposition this has been and will continue to be a highly profitable enterprise for the people of the State and for the North Michigan railroads. The returns of health and pleasure can not be computed in money. These important and inexpensive results have been secured by a hearty co-operation of the railroad officials with the Board of Fish Commissioners and the Legislative Committee on Fisheries and Game.

The people of Plymouth are in mourning. The charter of American liberties which came out of the cabin of the Mayflower has been defied and profaned. Most of the good people of the Colony hold a share apiece in the Old Colony Railroad, and for many years have used the certificate for the purpose of taking a free shopping excursion to Boston

on the day of the stockholders' annual meeting. But this year the 25 stockholders who were present at the meeting with one accord sustained the heartless capitalist who moved that the stockholders' privilege of a free ride be forever abolished. The five or six hundred stockholders who had been detained in the dry-goods stores were thus most completely euchred, and there is no help for it. Last year, of the 600 stockholders who took the free ride, practically none at all attended the meeting, only nine persons in all being present. This outrage on the people of Cape Cod will inspire with terror the Boston & Albany stockholders in the western part of the State. If it becomes generally known before the lease question is settled, we predict that the New York Central people will have to throw up the sponge.

A Philadelphia paper says that "Superintendent X of the A. B. C. road forbids employees to speak of wrecks as wrecks. They are hereafter to be called derailments or accidents. When cars are thrown from the tracks the term derailment must be used. Other smash-ups will be called accidents. The name of the wrecking car has been changed to tool car." That's all right. The order will not do much good, for a generation or two, but it tends to inculcate the habit of accurate expression. But to the reporter who prints this as a covert slur on the Superintendent, we would suggest that newspapers are worse offenders in this matter than railroad employees. To put the heading "Railroad Disaster!" or "Railroad Accident!" on an account of a pedestrian being killed or injured by a locomotive, is not merely loose language, it is misleading.

NEW PUBLICATIONS.

The Steam Engine Indicator. Being Directions for the Selection, Care and Use of the Instrument and the Analysis and Computation of the Diagram. Compiled from the regular issues of "Power," with revisions and extensions, comprising numerous tales. Octavo, 208 pages, index and illustrations. New York: The Power Publishing Co., 1898. Price, \$1.50.

The editor of "Power," Mr. Low, in a short preface explains that this book is a compilation of contributions to the literature of the indicator and its diagrams which have been prepared from time to time by him for the columns of "Power" and "are addressed to the practical man who desires to apply the indicator as an instrument of ordinary precision to the problems of steam engine design and operation." As an elementary treatise on the indicator it is excellent. We use the word elementary, simply as suggesting that the book is adapted for the very beginner in the study of this most useful means of investigating the performance of a steam engine. Yet to study the book with profit presupposes a mind that has had training enough to grasp mechanical design and processes, and to follow somewhat difficult courses of reasoning. Furthermore, the man who has already become expert in the use of the indicator and the study of indicator diagrams will find valuable information and suggestion in the volume. The scheme of treatment is eminently reasonable and the style is clear and simple. Obviously, the author has profited by the fact that he like Huxley has been striving for years to make complicated subjects clear to people of moderate intelligence.

The first three chapters describe indicator rigging, the method of putting it on, the diseases to which it is liable and the means of diagnoses and cure. The fourth chapter deals in general with the ideal diagram. Then in six chapters the different parts of the diagram are considered analytically, and other chapters give the methods of measuring the diagram, of computing horsepower and of determining the steam consumption. Two chapters deal especially with diagrams of compound engines, and finally there is a chapter on errors in the diagram and one on measuring the clearance. There are a number of useful tables.

Poor's Manual of the Railroads of the United States. With an Appendix containing a full Analysis of the Debts of the United States, the several States, Municipalities, etc., also Statements of Street Railroad and Traction Companies, Industrial Corporations, etc. New York: H. V. & H. W. Poor, 44 Broad St. 1899, 32nd annual number.

Three weeks ago we published some notes from the advance sheets of the introduction to Poor's Manual for 1899. The volume is now received. Of course everybody who ever uses statistics of the kind collected in this valuable compilation knows perfectly well its scope and character. We discover this year no new features except 16 pages in the Introduction entitled "A Study in Railway Statistics," made, we suppose, by Mr. Meany, the editor. This is a review of the statistics of the development, finances, etc., of the railroads of the United States with a special reference to the period from 1880 to 1899. The beginnings of the railroads of the country are briefly reviewed and then appears a table showing the terminal points and mileage of all railroads completed and in operation in the United States in 1840. This will be particularly interesting and valuable to the student, for it is information which is often called for and is difficult to find. Another table, the compilation of which must also have been difficult, is a

statement showing the annual earnings from passengers, from freight and total of all the railroads of the United States in actual operation in 1851. Another table shows the yearly progress in railroad building from 1849 to 1860, and still another gives the terminal points of the first railroad, or section of railroad, built in each State in the Union with its length and date of opening. The text accompanying these tables is a concise and intelligent review of the growth of the railroad system.

Machine Design. Part II. Form, Strength, and Proportions of Parts. By Forrest R. Jones, Professor of Machine Design in the University of Wisconsin, etc. New York: John Wiley & Sons, 1899. IX. + 353 pages; 179 figures; 8vo.; cloth. \$3.00.

In his preface Mr. Jones explains that he has confined his book to the treatment of such subjects as the designer must have to deal with every day. Equations and formulas are put into form for ready application. Whenever possible the results of practice or of experiments as presented by some engineer or experimenter are used in preference to abstract statements.

The 14 chapters cover the design of bearings with regard to lubrication; of various gears, for transmitting motion; of various forms of fastenings and keys; of axles, shafts, couplings and pulleys; of cylinders, riveted joints, frames of machines, and finally selection of materials. The designs are shown by simple drawings and their theory is treated with clearness and intelligence. The plan of taking designs and methods of treatment from the actual work of the many scientific men who are running the great shops of the country is an excellent one. For instance, in treating of the matter of forced fits the author summarizes the practice of E. P. Allis, Baldwin's, Pennsylvania Railroad, Rogers, Schenectady, Union Iron Works of San Francisco and half a dozen others. He gives a special table for fits of crank pins and for driving, truck and car axles taken from the practice of the Chicago, Milwaukee & St. Paul. Riveted joints are illustrated by examples of the work of the Baldwins and the Continental Iron Works.

TRADE CATALOGUES.

The Baker Car Heaters.—We have received a new catalogue of Baker heaters from Mr. William C. Baker, 143 Liberty St., New York City. The only new feature shown is the two-coil perfected heater, the casings and coils of which are 10 in. higher than those of the single coil perfected heater, giving double the heating surface. Most of the parts of this heater are the same as for the single coil heater. The pamphlet consists of 66 octavo pages with an alphabetical index and gives in very compact but complete form the various styles of Baker heaters and all their parts.

Brakebeams.—The Sterlingworth Railway Supply Co., of Easton, Pa., Home Life Building, New York City, etc., sends to us a pamphlet on the merits of the rolled steel brakebeam, of which 400,000 are said to be in service. It is designed especially perhaps as a reply, or possibly counter-irritant, to a more or less humorous pamphlet got out by a rival brakebeam company about the time of the conventions. The motto adopted is: "Those whom the gods would destroy they first make mad." It will amuse and instruct the reader to see this pamphlet.

Machine Tools.—The 1899 catalogue of improved machine tools issued by Messrs. William Sellers & Co., of Philadelphia, is a square volume of 354 pages, substantially bound and well printed. It shows a great number of machines, giving brief descriptions of them, and the publishers suggest that if intending purchasers should not find in this catalogue machines which meet their requirements in capacity or kind they (Messrs. Sellers & Co.) may nevertheless be prepared to furnish what the customers want.

Roberts, Throp & Co., Three Rivers, Mich., have issued a new 6 x 9 in. catalogue of hand and push cars and railroad velocipedes. Many varieties of these are illustrated by half-tone engravings, and we note that all are shown with the "Donovan" pressed steel wheels, illustrated in our issue of September 15 last. These cars are also equipped with roller bearings unless plain brass ones are desired.

Improvements on the Norfolk & Western.

[From the Annual Report.]

The policy of the Company of making liberal expenditures in putting the property in good condition for the most economical operation, has been continued during the year.

The expenditures for maintenance of way and structures aggregated \$1,536,633.40, equal to about \$988 per mile of road operated, as against \$986 per mile for the preceding year; 25.65 miles of main track have been relaid with 85-lb. steel rails, and 55.86 miles with 75-lb. steel rails; 31.95 miles of track were fully ballasted; 1,918 lineal feet of wooden trestles were replaced by masonry and embankments; 203 lineal feet of wooden

trestles were replaced with steel structures and masonry; 2,402 lineal feet of old, weak bridges have been replaced by strong steel structures, and 740 lineal feet of light bridges have been strengthened. Considerable work has been done in renewing defective bridge and culvert masonry.

The work of reducing grades has been continued. Changes of grade at Zuni and Suffolk were completed during the year. Considerable work has been done in the graduation for a second track between Christiansburg and Elliston, and on the western slope of Flat Top Mountain, but only 0.79 miles of second track had been laid at the close of the year.

The slips along the coal piers at Lambert Point have been excavated to a depth of 30 feet of water at mean low tide. A coaling station has been constructed at Delano and a rail-sawing mill has been erected at Roanoke.

The important work of the Radford cut-off has been described at length with illustrations in the Railroad Gazette.

Mr. Ashley on "Trust" Combinations.

At the recent convention of the American Bankers' Association, Mr. O. D. Ashley, President of the Wabash Railroad, presented a paper on "Business Prospects." In the course of that paper he had something to say about the great combinations of industrial companies, which, for want of a better name, people call trusts. We reprint below some paragraphs from his paper.

But perhaps the most conspicuous feature in the business evolution of the period is to be found in the rapid increase of so-called Trust Combinations, but more correctly designated as industrial companies. The number and variety of the industries and the extent of the capitalization have bewildered the community, and something like the multiplication of schemes during the South Sea Bubble times seemed to be in contemplation. An extended list of such organizations, during the six months ending June 30th, published in the Financial Chronicle in July last, was of startling significance. Here were companies, said to be in process of formation, embracing an aggregate capital of \$3,140,350,000, of which \$119,800,000 was in bonded debt, \$1,040,975,000 in preferred stock, and \$1,981,075,000 in common stock.

An exhibit of this character brought the subject to public attention in concrete form, and awakened well founded apprehension. To the timely warning which this statement conveyed, and to the distrust which had been gaining ground in Wall Street, we may ascribe the wholesome check given to this description of enterprise, as well as to the wild speculation which had been spreading at stock exchange centers throughout the country. This phase of financial undertaking has undoubtedly been the most dangerous feature developed in our expanding trade and manufacturing industries, and, if its recognition leads to more conservative and prudent methods, the situation will be much improved and the country will be saved from the disastrous results of a prodigious inflation.

It is not, however, to the organization of industrial companies, per se, that opposition is well founded. There is nothing in the organization of the body politic or in the character of our republican institutions to prevent the association of men or of industrial or trading companies, if such associations are considered by the interested parties more conducive to their success, provided such organizations are not clearly opposed to the public good. It is idle to suppose that any combinations of this character can monopolize industries. Competition is by no means extinguished by the union of producers and the regulation of supply. Whenever any of these concerns attempt the extortion of unreasonable profits, a powerful rivalry would be stimulated with an abundance of capital to support it. A movement, therefore, on the part of industrial companies in that direction would be extremely stupid.

A more forcible objection to these combinations can be found in the extravagant over-capitalization adopted by the promoters. In most of the schemes offered to the public for subscription the bonded debt and preferred stock are fully equal to, and often in excess of, the real value of the property represented, while the common stock is simply a bonus which is divided between the promoters and the original proprietors. This is the weak point in all such projects, and all the more dangerous on account of the success of the Sugar and Tobacco combinations, which have given large returns to the holders of common stock. These two concerns deal in articles of universal consumption, and have not only been shrewdly managed, but, the Sugar Company especially, have been formed by circumstances. Now to conclude that similar results are likely to follow in the numerous projects announced would be extremely foolish. It is, of course, possible that some of these concerns may earn dividends on their common stock, but a year or two of exceptional activity and abnormal demand cannot be safely taken as proof of permanent prosperity. Exaggerated valuation, therefore, as illustrated in over-capitalization, furnishes the strongest argument against industrial stocks.

The transportation interest, as reflected by railroad traffic, shares in the general prosperity, so far as the gross earnings of the lines prove such participation. The returns of the year thus far show handsome gains over 1898, although comparing with a period of improvement over the previous year. A continuance of the present conditions promises for the fiscal year ending June 30, 1900, the largest aggregate in gross earnings in the railroad history of the country, but, in consequence of the low rates, it would be over-sanguine to expect a corresponding gain in the net proceeds. Very large outlays for rolling-stock and betterments also tend to a reduction of present profits, if such expenditures are charged to operating expenses. Railroad property is, nevertheless, entitled to more favorable consideration, in view of the growing volume of traffic and the diminishing severity of competition.

TECHNICAL.

Manufacturing and Business.

On Sept. 20 the planing mill of the Illinois Car & Equipment Co. at Hegewisch, Ill., near Chicago, was destroyed by a fire which apparently originated in the engine room. The loss is estimated at about \$250,000, principally on machinery, as the finishing and electrical departments were in the same building. At the time of the fire the company was completing about 25 cars a day, and was said to have orders on its books for about 800 cars. It is understood that the mill will be rebuilt as soon as possible.

C. E. Walker, who has been Master Mechanic on the Baltimore & Ohio Southwestern at Washington, Ind., since July, 1895, has now made connections with the Chicago Pneumatic Tool Company, and will open an office for them in Cincinnati. Mr. Walker learned the trade of machinist at the National Locomotive Works, Connellsville, Pa. In 1879 he went with the Chicago, Burlington & Quincy, and since that time he has passed through all grades of mechanical work on several different railroads.

The Chatham & Lebanon Valley Railroad, Wm. C. Roberts, President, 11 John St., New York City, wants second-hand material as follows: One thousand tons of 60 to 70-lb. relaying rails, 30,000 standard ties, four passenger coaches, two combination coaches, 10 box cars and two 40-ton passenger locomotives.

Chas. A. Fey, Chief Engineer of the Link Belt Engineering Co., has returned from a two months' trip abroad.

The Q & C Company and the National Railway Specialty Company, both of Chicago, announce that hereafter all "Dunham" and "Q & C" freight car door fixtures, as well as the "Security," will be sold by the National Railway Specialty Company; but the Q & C Company will continue to make these fixtures in its shops at Chicago Heights. Hereafter orders for "Dunham" and "Q & C" door fixtures should be sent to the National Company, 1475 Old Colony Building, Chicago.

Iron and Steel.

Application will soon be made at Harrisburg, Pa., for a charter for the Standard Seamless Tube Co. The names mentioned in connection with the company are Charles E. Pope, John H. Nicholson, W. H. McKelvy, Herman J. Veeder and J. Erastus McKelvy. The capital stock is to be \$500,000, and a plant will be built in the Pittsburgh district to make seamless tubing.

The Common Pleas Court, Sept. 21, at Findlay, O., confirmed the sale of the Kellogg Tube Co., to the Baltzley-Heckert Co.

Reports state that the Massillon Iron & Steel Co. has been organized in Massillon, Ohio, by C. M. Russell, C. L. McLain and H. A. Croxton.

The Pennsylvania Foundry & Manufacturing Co. of Pittsburgh, Pa., has been reorganized with a capital of \$100,000, and hereafter will be located in Akron, O. It has bought the plant of the Buell Manufacturing Co. in South Akron, O., and will remove its works from Pittsburgh, Pa., to Akron.

The Pittsburgh Iron & Steel Co. will soon make application for incorporation in Pennsylvania. The applicants are: J. N. Pew, Arthur E. Pew, W. S. Miller, T. S. Bigelow, and Frank Cross. The steel works the company proposes to build will be on the Ohio River at Beaver, Pa.

Interlocking.

The State Railroad Commissioner of Michigan has approved the construction of a crossing over the Chicago & West Michigan for an extension of the Manistee & Northeastern, which is to be built. Interlocking signals are ordered.

The Portsmouth Dry Dock.

The contract for building a stone dry dock at the Portsmouth Navy Yard, Portsmouth, N. H., was awarded by the Navy Department on Tuesday of last week to John Peirce of New York. The contract price is \$1,089,000. Mr. Peirce has the contract for building the Hall of Records in New York and the Federal Building in Chicago. The dimensions of the dock will be: Length on coping, from head to outer gate sill, 750 ft.; length on floor, from head to outer gate sill, 725 ft.; width on floor in body, 80 ft.; width on coping in body, 130 ft.; width at entrance, mean high water, 100 ft.; greatest depth, from coping to floor in body, 39 ft.; draught over sill, at mean high water, 30 ft. The specifications call for three centrifugal pumps, each capable of discharging 43,000 gallons of water a minute.

New Bridges for the Southern Pacific.

The Southern Pacific Co. is building a new bridge over the Merced River, near Livingston, California. It is of two steel through spans, 130 ft. long, with iron cylinder piers filled with concrete. The south abutment is of concrete, granite coping. Trestle approach at north end. Another bridge, over the Stanislaus River, at Oakdale, Cal., has two steel deck spans, each 140 ft. long, with concrete, monolithic piers on pile foundation, and granite coping. Trestle approach at each end.

Ventilation of the Hoosac Tunnel.

Officers of the Fitchburg Railroad and the North Adams Electric Light Company last week tested the electric rotary fan which has been put in at the top of the central shaft to exhaust the smoke from the tunnel. The test was satisfactory as far as it went, but it has not yet been possible to determine what speed will be necessary to satisfactorily ventilate the tunnel when trains pass through frequently.

Tie Preserving Plant.

The Burlington road is putting up apparatus at Edgemont, S. D., for treating sleepers and timber for preservation. It is said that the apparatus will have a capacity of 5,000 ties a day.

The Ajax and the Brass Trust.

A report has been circulated pretty widely in the daily and commercial papers to the effect that the Ajax Metal Company has joined the so-called "brass trust." We are informed that it is not the intention of this company to go into any such combination. The company is not in any way connected with any brass trust.

Steel Staybolts.

A test made on August 10 by the Pittsburgh Testing Laboratory of steel staybolts made by the Falls Hollow Staybolt Company is interesting to record:

Elastic limit.....37,410 lbs. per square inch
Ultimate tensile strength.....58,320 lbs. per square inch
Elongation in 8 inches.....32.5 per cent.
Reduction in area.....63.0 per cent.

These hollow steel bolts are furnished by the Falls Company largely for marine boiler work, but the company continue to recommend their hollow charcoal-iron bolts for locomotive fireboxes.

Electric Machinery for the "Alley" Elevated.

During the next few weeks the South Side Elevated (Chicago) will receive the new engines and generators which will be installed at its power house at Fortieth and State Sts. The new equipment was ordered some months ago, and it is said will add 4,800 horse-power to the capacity of the plant, all of which is needed to handle the increased traffic.

Proposed M. C. B. Brake Shoe Tests.

The Standing Committee of the Master Car Builders' Association on Brake Shoe Tests has decided to make a series of laboratory tests of brake shoes at an early date, which tests will include only new brake shoes that have not already been tested by the Committee, and which may properly be considered as being in the market, or having some considerable use on some railroad. All brake shoe makers who wish to avail themselves of this opportunity to have their shoes tested should communicate at once with the Chairman of the Committee in reference to the details of the test, and should state in their communications to what extent their shoes are used. Communications should be sent to Mr. S. P. Bush, Superintendent of Motive Power, Pennsylvania Lines West of Pittsburgh, Columbus, O. The other members of the Brake Shoe Committee are Messrs. Geo. Gibbs and R. P. C. Sanderson.

The M. C. B. Coupler in Russia.

The Nesseldorf Car Building Co. of Nesseldorf, Germany, has recently sent three sample freight cars equipped with vertical plane car couplers of the M. C. B. type, to St. Petersburg, Russia, for a road-test of the couplers. This is the first incursion of the M. C. B. coupler in the Czar's domain. The draft rigging arrangement on the car is similar to that described and illustrated in the Railroad Gazette of July 28 this year. The cars themselves are of a novel construction, being built entirely of steel, except the floor and the sides. The side planks are removable, so that the cars may be transformed into open cars. The weight of the empty car complete with air brake is 21,820 lbs., and the capacity is 20 tons. The designers claim that the draft rigging on these cars is superior to those used in this country, inasmuch as the cars can traverse a curve of 200 ft. radius without uncoupling. According to the "Zeitschrift fur Lokomotiv-fuehrer," the coupler test is now under progress in the Warsaw yards, under the direction of an imperial commission. The result will be watched with interest, for an imperial ukase decreeing the use of any particular type of couplers within the empire, as in the case of the Westinghouse Air Brake, would mean a great deal to the manufacturers.

The League Island Navy Yard.

The Bureau of Yards and Docks of the Navy Department will receive proposals until Oct. 21 on new specifications for the new dock at the League Island Navy Yard. The specifications divide the work into three parts, as follows: Part A includes the furnishing of the dry dock structure proper, pump house, boiler and engine house, the approach structures, performing the dredging and furnishing all other material and doing all work of any character called for by the plans and specification, and not specifically mentioned in Part B or Part C. Part B includes the furnishing and installing in place of the operating machinery and power plant for the dock, with all appurtenances, including the necessary piping and foundations with bolts, for the satisfactory working of the dock. Part C includes the furnishing

of the caisson complete in place, with all operating machinery, etc., for the same.

New Bridges on the Western Ry. of Alabama. Grant Wilkins, of Atlanta, Ga., has a contract for building the new bridges for the Western Railway of Alabama. This work consists of five spans of all steel, through bridges, two of the spans of 140 ft. each, are over Euphaupee Creek, near Chehaw, Ala. One span of 130 ft. is over Line Creek, near Shorter's, Ala. One span of 124 ft., over Cabell Creek, near Goodwyn's, and the other span is 124 ft. over Soapstone Creek, near Manack, Ala. The material for these bridges was made by the Passaic Rolling Mills, Paterson, N. J., and is now being delivered, and the erection has been begun. They are all proportioned for 125-ton locomotives, under Theodore Cooper's specifications, 1896.

THE SCRAP HEAP.**Notes.**

A fire at the Union Stock Yards, Chicago, on Sept. 21, destroyed a hotel and other buildings belonging to the Stock Yards Company, involving a loss of about \$300,000.

The express messengers on the Northern Pacific, who have been running through from St. Paul to Helena, 1,130 miles, and from Helena to Portland, 926 miles, have had their trips shortened. The runs will now be from St. Paul to Miles City, 745 miles, thence to Spokane, 767 miles, and thence to Portland, 544 miles. These runs, even after being shortened, are somewhat lengthy as compared with those made by Harnden and Alvin Adams in the early days. We assume that the Northern Pacific messengers take along a lunch basket.

The Industrial Commission, the special Federal Commission which is investigating all industries, has decided to make an extensive inquiry into the subject of railroad finance, rates, etc., and has summoned for examination early in October Interstate Commerce Commissioners Knapp and Prouty, Commissioner Reagan, of Texas; A. J. Vanlandingham, of St. Louis; David Bingham, of New York; N. B. Kelly, of Philadelphia; John K. Cowen, M. E. Ingalls, Albert B. Stickney and S. R. Callaway. The Commission has appointed Professor Edward Dana Durand, of Leland Stanford Junior University, to collate and prepare the data forming the basis of the Commission's final reports to Congress. Professor Lindsay, of the University of Pennsylvania, has been appointed to investigate and report on the subject of railroad labor, and Professor Johnson, of Lansdowne, to investigate and report on the subject of construction and financing of American railroads.

At Owensboro, Ky., a grand jury has returned indictments against the Louisville & Nashville, the Illinois Central and the Louisville, Henderson & St. Louis railroads for violating the separate passenger car law. Evidence was given to the effect that the cars provided for colored passengers are not equal in quality and convenience to those furnished for whites.

The men employed on vessels on the Lakes have been granted a considerable increase of wages from Oct. 1. The Executive Committee of the Lake Carriers' Association met at Cleveland last Monday and decided to advance the pay of engineers 20 per cent. and other classes from 10 to 20 per cent.

New Record for Rolling Rails.

On September 22, the rail mill of the Illinois Steel Company at South Chicago, rolled 1,318 tons of steel rails in 12 hours; the best previous record being 1,310 tons.

A New Wire Fence.

The Crescent Metallic Fence Stay Co., Covington, O., exhibited at the Detroit meeting of the Roadmasters' Association a new wire fence for use along the right-of-way of railroads. This fence makes use of either plain or barbed wire, which is fastened to the posts in the usual way, the new feature being a series of vertical stays long enough to engage three or four wires. These stays, or stiffeners, are put on after the horizontal wires are in place, and consist of pieces of steel of different lengths, 3/64 in. thick, and 1 1/2 in. wide, so pressed that the cross-section is a half-circle. Notches are formed along the sides of the stays to take the wires, the stays and wires being tied together at each crossing by wire loops. A special tool is furnished so that these fastenings are easily made. The Cleveland, Cincinnati, Chicago & St. Louis has used a considerable quantity of this fencing.

The St. Paul's Suburban Entrance to Chicago.

On Sept. 18 the ordinance granting the Chicago, Milwaukee & St. Paul the right to use electricity on its Evanston Branch was sent back to the Committee on Streets and Alleys North for further discussion of the compensation clause, which the road is not willing to accept in its present form.

Automobiles in Chicago.

It is reported from Chicago that the Siemens & Halske Co. will establish a system of storage battery vehicles which can be used either as omnibuses or as street cars, and similar to the autocars now in use in Berlin. The idea is to run the cars through all sections of the city at a five-cent fare, the batteries to be charged either from trolley wires or at charging stations. It is said that the Illinois Electric Vehicle Co. and other electrical concerns are interested in the plan and that a capital of \$5,000,000 will be used in the business. Each omnibus will carry from 20 to 25 persons, and cost about \$3,500.

A Railroad in the Adirondack Forest Preserve.

The Raquette Lake Railway Co. was incorporated in April with a capital stock of \$250,000, to build

a railroad from the Clearwater station (on the Adirondack division) east about 19 miles to Raquette Lake. It will be worked under the street railroad laws, on the wagon road, where the steam engine is not allowed. Steam not being permitted on street railroads, the only thing for the company to do was to decide upon some other motive power than steam and electricity, the latter being thought dangerous in the dry season in the forest. The Chief Engineer says that either compressed air or stored steam will be used. The contract for building the new railroad was let to John Whalen of Whitehall, N. Y., who has already laid rails to Eagle Bay, and who, according to last report, had about 600 men employed. All bridges on the new line are of steel.

The directors of the Raquette Lake Ry. are C. P. Huntington, H. P. Whitney, J. P. Morgan, Chauncey M. Depew, Dr. W. Seward Webb, E. M. Burns, W. W. Durant, John A. Dix, Samuel Callaway, C. E. Snyder and I. E. Gates. The officers are: President, C. P. Huntington; Vice-President and General Manager, Edward M. Burns; Herkimer, N. Y.; Treasurer, I. E. Gates, Mills Building, New York; Secretary, C. H. Burnett, Utica; General Counsel, Chas. E. Snyder, Herkimer; G. E. Ward of Utica is the Engineer. Mr. Burns is also Purchasing Agent. The general office of the company is in Herkimer.

Chicago Elevated Roads.

The South Side and Metropolitan Elevated roads are now supplying power to operate the Union loop, as it has been found cheaper at present to supply power from these roads than to run the smaller Loop power house. As Loop business increases it is expected that it will be necessary to run its own power house.

The South Side Elevated carried 1,630,569 passengers in August, a daily average of 52,599, as compared with an average of 52,644 in July, 1899, and of 41,770 in August, 1898. This exceeds the daily average for all of 1898, and is a gain of 26 per cent. over August, 1898. As August is the poorest month in the year it is interesting to note that the record shows that this year it has the highest percent. of increase. The comparative record for the eight months of 1898 and 1899 is as follows:

	1899.	1898.	Per cent. of gain.
January.....	58,762	52,117	12.75
February.....	60,292	52,682	14.42
March.....	63,909	54,828	16.54
April.....	63,878	54,149	19.96
May.....	60,588	49,469	20.47
June.....	56,117	46,427	23.33
July.....	52,644	44,148	19.24
August.....	52,599	41,770	26.00

The Railroads of New South Wales.

The quarterly report on Railways and Tramways of New South Wales for the period ending June 30 is received. At that time the miles of railroad opened aggregated 2,706 1/4. The revenue was £690,114. While the miles had increased by 15, as compared with the same quarter of 1898, the revenue had decreased by £24,700. The number of passengers carried and the tons of freight carried had increased somewhat, but the passenger-haul fell off, the average freight rate declined and special reductions in rates had been made on account of the drought, in order to afford relief to starving stock.

A New Railroad in British Honduras.

The Consul at Belize reports that R. W. Perks, M. P., has submitted a proposition for building a railroad from Belize, to run west about 150 miles to La Libertad or Flores, in the Peten Province of Guatemala. Of this about 72 miles would be in British Honduras. Among the propositions is one for a pier at Belize, extending from high-water mark into 19 ft. of water. The entire proposition is conditioned on the obtaining of a concession from the Guatemalan Government for that end of the road. Mr. Perks asked for a grant of £75,000, payable in five equal installments as each of five sections is completed, and also for a land grant of 200,000 acres in blocks of 40,000 acres. On Aug. 15 the Legislative Council of British Honduras accepted the proposal, with a recommendation that if approved by Mr. Chamberlain, the British Colonial Secretary, the work should be begun not later than February, 1900. The Consul thinks that while the proposal comes from British capitalists, the entire equipment will be bought in the United States, since railroads now operating in Honduras, Guatemala and Costa Rica are equipped with American rolling stock and machinery.

Japan Railroad Notes.

The section of the Tobu Railroad between Kitasenju and Kuki, 25 miles, has been finished and opened for traffic.

Mr. T. Ogura, dealer in kerosene oil, Kobuna cho, Nihondashi-Ku, Tokio, has had 50 tank cars built for carrying oil. One large tank has been built in the vicinity of the Nagata station, and another is being built at Koshimozaki, from which oil will be carried in the tank cars to Lumidagawa Station. From that point a pipe line will be built to the Sumida River and the oil allowed to pass from the tank cars through the pipe to tank boats, three of which, each having a capacity of 12 tons, have been built. If the experiment proves a success, Mr. Ogura will introduce the scheme into other parts of Japan.

The Erie Canal Electric Traction Co.

A meeting of the Erie Canal Electric Co., which recently organized to introduce electricity for power on canals, was held in New York this week and elected the following officers: President, Mr. Louis Von Hoffman; Vice-President, Mr. Frank W. Hawley, and Secretary, Mr. A. B. Donaldson. It is stated that the capital of the company amounting to \$5,000,000 has been underwritten by a Wall street syndicate. The following directors were elected this week: Louis A. Von Hoffman, William Mertens, Henry R. Ickelheimer, John G. Carlisle, Charleton T. Lewis, Thomas C. Platt, Frank W. Hawley, James Virdin, William H. Baker and George W. Balch.

New Machinery at Niagara Falls.

The Niagara Falls Power Company has called for bids from a number of contractors for a new wheel pit 400 ft. long, 180 ft. deep and 20 ft. wide. This will be cut out of solid limestone at the inlet canal opposite the present power station. This pit will be large enough for at least ten 5,000 h. p. turbines, which will about double the present output of the plant. It has not been decided, however, the number of wheels which will be put in the pit.

The Canadian-Niagara Power Company has taken preliminary steps for the building of a large plant and has let a contract for the boring of a number of

holes along the line of the proposed tunnel on the Canadian side. Nothing definite is known further than that the contract has been let for the borings.

Pigeongrams by Pigeon Post.

According to an account in the Philadelphia Public Ledger, the Government of New Zealand, through its post office department, now sends communications regularly by carrier pigeons between Auckland and Great Barrier Island, a distance across the water of about 30 miles. The fee charged for a single message is one shilling, which is the cost of a stamp that has to be bought at the post office.

A Tower Bridge for Chicago.

The City Engineer has been instructed to report on the feasibility of a plan to connect the North and South sides Boulevard Systems by a bridge connecting two very high towers, to the tops of which access is to be had by spiral roadways.

Chicago Drainage Canal.

As indicated last week, the Trustees of the Sanitary District asked the court at Joliet for an injunction preventing that city from interfering with its work on the bridges at that point in violation of the agreement between the Board of Trustees and the City of Joliet. On Sept. 21 Judge Hilscher, after having the application amended to provide for the building of only one bridge at a time, granted a temporary injunction against Joliet. The court sustained the original agreement and holds that the city is bound by it. This provides that the City of Joliet must pay \$10,000 toward the erection of the bridge at Jefferson St.; and one-half the extra cost of the work must now be paid by the city. Work on the Jefferson St. bridge will be commenced at once and the two other bridges will be built immediately afterward. The decision saves the Sanitary District about \$18,000. (Sept. 22, p. 665).

Lake Notes.

A big freighter was launched at the yards of the Union Dry-Dock Company, Aug. 30. The new boat, to be called the Buffalo, is 403½ ft. long, of 68 ft. beam, and 28 ft. depth. She will carry 5,700 net tons of freight in 17½ ft. of water. She was built for the Western Transit Company at a cost of \$350,000.

The new docks of the Copper Range Railway at Houghton, Mich., have been finished and are now in use. They are about 1,300 ft. long, one side being blasted out of solid rock.

The Great Northern is about to let the contract for an ore dock at Duluth to be 73 ft. high, 63 ft. wide and 2,100 ft. long. It will have 350 pockets, 12 ft. wide. The capacity will be 100,000 tons of ore, and the estimated cost is \$700,000. The largest dock previously built in the Lake Superior region is one for the Minnesota roads, which is 60 ft. high, 49 ft. wide and 2,400 ft. long, with a capacity of 60,000 tons.

The new steamer Angeline, built for Pickands, Mather & Co., was launched from the Wyandotte yards of the Detroit Dry Dock Co. on Sept. 2. She is 435 ft. long, 50 ft. beam and 28 ft. deep. It is reported that another large ore carrier has been ordered from these yards.

Almost complete returns reported by the Iron Trade Review from upper Lake docks show that 2,925,000 tons of ore were shipped during August. Added to the total of 7,639,706 tons to Aug. 1, this gives a total to Sept. 1 of 10,564,000 tons, or more than 1,400,000 tons more than for the same period last year. The rate from Duluth went to \$2 last week.

By the sinking of the steamer Douglas Houghton on Sept. 5 across the channel of St. Mary's River at its narrow part, all Lake Superior traffic was blocked. The accident was caused by the breaking of the rudder chain of the steamer. This made her swing around in the swift current, wedging her bow in the rock at one side. She then swung across the channel and was rammed by her consort, the barge John Fritz. The boats are among the largest on the lakes and were loaded with ore. The steamer sank at once, and remained until Sunday, Sept. 10, when after hard work she was raised and the channel freed. It was necessary to lighten part of her cargo, to patch the hole in her side and to blast away the rock at the side of the river, into which her bow was wedged, for 12 ft. Meantime more than 200 of the large lake vessels were detained by the wreck. The column of waiting boats was 40 miles long, and when the channel was cleared they started down one-third of a mile apart. The upbound fleet of 40 vessels was ordered to wait until the vessels bound down were out of the way. The fleet carried about 300,000 tons of iron ore, over 12,000,000 ft. of lumber, and 600,000 bu. of wheat, beside general merchandise. The money damage to the Houghton and Fritz and cost of wrecking is estimated at about \$100,000, and the damage to the commerce of the lakes, which was interrupted at the height of the season is estimated at \$1,000,000, coming as it did when the rates were at the highest point in years.

The work of widening the channel at Toledo, Ohio, from the present width of 200 ft. to 400 ft. for 15 miles through Maumee Bay, will be commenced by the Lydon & Drews Co., of Chicago, which has the contract, as soon as weather permits. It is estimated that it will take six years to complete this work; and that 5,000,000 cu. yds. of earth and sand will be excavated. The channel is to be 20 ft. deep.

Technical Schools.

University of California.—It is announced that the Board of Regents has awarded the prize in the competition for the design for a \$15,000,000 group of buildings to M. Benard, of Paris. In addition to the usual percentage on total cost of the buildings, the selected Architect will receive a special premium of \$10,000 for the best design.

Washington University, St. Louis.—In our issues of March 24, p. 215, and April 7, p. 250, we noted gifts of over \$1,000,000 for five new buildings to be located on the new site of the University, and for additional endowments. In order to choose an architect for the new buildings the Board of Trustees has invited two architectural firms in St. Louis and four from other cities to compete, each competitor to be paid \$750. Any other St. Louis firms may compete, but without compensation. The date of the competition is Oct. 15, and the invited architects are: Messrs. McKim, Mead & White, New York City; Messrs. Carrere & Hastings, New York City; Messrs. Cope & Stewardson, Philadelphia; Mr. Cass Gilbert, St. Paul; Messrs. Eames & Young, St. Louis, and Messrs. Shepley, Rutan & Coolidge, St. Louis. To carry out quickly the plans of the architect after their adoption, a careful survey of the grounds of the new site has been made and a large amount of grading will

probably be necessary. Messrs. Olmstead Bros., of Brookline, Mass., have been retained by the Board as landscape architects. After the architect is chosen it will probably be six months before the plans are completed and the contracts let for the buildings. In accordance with the opinion of the invited architects that it would not be possible for them to complete the buildings in time for the beginning of the University year in September, 1900, it has been decided to put off the removal of the University until September, 1901.

Armour Institute of Technology, Chicago.—The seventh year of the Institute opened Sept. 21 with an attendance of nearly 1,300, the largest in its history. Four-year courses in mechanical, electrical, and civil engineering, and in architecture and science are now offered, each leading to the degree of B. S. The courses in civil engineering and Spanish, which are new this year, have proved attractive to students. Prof. C. E. Freeman, Associate Professor of Electrical Engineering, is planning some tests in wireless telegraphy on the Marconi system, which will be made soon.

LOCOMOTIVE BUILDING.

The Wisconsin Central is considering buying some new locomotives.

The Great Northern of Canada will shortly be in the market for locomotives.

The Texas Midland is said to want 15 locomotives, but we have no official information at this time.

The Niagara Junction is reported to have ordered one locomotive from the Baldwin Locomotive Works.

It is reported that the Florence & Cripple Creek has ordered one locomotive from the Baldwin Locomotive Works.

The Grand Trunk has placed an order for 10 locomotives for November delivery, with the Baldwin Locomotive Works.

The Delaware, Lackawanna & Western has ordered 30 new engines, 16 of which went to the Brooks Locomotive Works.

The Duluth & Iron Range has ordered six 12-wheel and four 10-wheel freight locomotives from the Schenectady Locomotive Works.

The Boston & Albany has ordered 12 engines from the Schenectady Locomotive Works; they include switching, freight and passenger engines.

The Baltimore & Ohio has ordered 20 more Vauclain compound consolidated freight engines from the Baldwin Locomotive Works. An order for 30 was placed with the same concern earlier in the month; 50 are to be delivered about the first of the year.

The Atchison, Topeka & Santa Fe has received from the Baldwin Locomotive Works two consolidation locomotives in which oil is to be used as fuel. The tenders have each a capacity for holding 500 gallons of petroleum and 4,500 gallons of water. These engines are to be used in Southern California.

We are officially informed that the Atchison, Topeka & Santa Fe has asked bids on 20 mogul locomotives, weighing 130,000 lbs. on drivers and 18,000 lbs. on truck, with 20 in. x 28 in. cylinders, and drivers 63 in. in diam.; also on 30 consolidation engines, weighing 150,000 lbs. on drivers and 18,000 lbs. on trucks, with 21 in. x 30 in. cylinders, and drivers 57 in. in diam. It is generally understood that 75 may be ordered altogether.

As noted last week, the Delaware & Hudson has ordered 10 engines from the Schenectady Locomotive Works. They are for February and March, 1900, delivery. They will be simple consolidation engines, weighing 154,000 lbs., with 133,000 lbs. on drivers. They will have 21 x 26 in. cylinders and the drivers will be 56 in. in diam.; Wooten boilers, with a working steam pressure of 180 lbs., and having 306 charcoal iron tubes, 14 ft. long, with an outside diameter of 2 in.; the fireboxes will be 120 in. long, 102 in. wide, of Carbon steel; tank capacity for water will be 5,000 gals., and for coal, 8 tons. They will be equipped with Westinghouse air brakes, Coffin treated axles, Lanson bell ringers, Central steel brake beams, Laplin brake shoes, Trojan couplers, Star headlights, Monitor injectors, U. S. Metallic piston rod and valve packings, Richardson safety valves, "She" sanding devices, Nathan sight-feed lubricators, National Spring Co.'s springs, Midvale tires on driving wheels, Taylor steel tires on truck and tender wheels; American cast steel wheel centers and cast steel frames.

The H. K. Porter Co. advises us that it is running very full of work, with orders coming in more rapidly than ever before. The company is at present building four heavy steel works locomotives for the Carnegie Steel Co.; four steel works engines for the Virginia Iron, Coal & Coke Co., of Bristol, Va.; one 11 x 16 steel works engine for the Lukens Iron & Steel Co., Coatesville, Pa.; besides a large variety of miscellaneous engines for various other concerns, including a 36-in. gage, 8 x 14 cylinder, back truck engine for the Ferrocarril de Obolatos de Mexico; a 7 x 12 in. cylinder, back truck design, 30-in. gage engine, for Cuba; two 28-in. gage compressed air motors for the Pennsylvania Coal Co., Dunmore, Pa.; a standard gage air motor for G. B. Markle & Co., Jeddo, Pa. (being the fifth machine of this class furnished this concern); a little 20-in. gage air motor for the Société des Mines de Golden River, of Damascus, California; four steel works engines for the American Steel & Wire Co.; one for the Phoenix Iron Co., Phoenixville, Pa.; one for the Latrobe Steel Co., Latrobe, Pa.; one for the Latrobe Steel and Coupler Co., Melrose Park, Chicago, etc., etc.; one 30-in. gage engine for the Raritan Copper Works, Perth Amboy, N. J., and one 30-in. gage machine for the Ray Copper Mines, of Riverside, Arizona.

CAR BUILDING.

The Boston & Albany will order at once 25 passenger cars.

The Wisconsin Central is considering buying a few passenger cars.

The Union Pacific will buy 40 passenger cars for the Oregon Short Line.

It is reported that the Central Railroad of New Jersey has asked bids on 500 box cars.

We are reliably informed that the St. Paul & Duluth will not order passenger cars.

The Great Northern of Canada is contemplating ordering some new passenger and freight cars.

We understand that the New York Central & Hudson River order for cars has been again postponed.

We understand that the Illinois Central order for a mixed lot of 36 passenger cars is about being let.

We are informed, but not officially, that the Grand Trunk will build 10 coaches at its Pont St. Charles shops.

The Chesapeake & Ohio has ordered four coaches and four combination cars from Pullman's Palace Car Co.

We understand that the Cleveland, Cincinnati, Chicago & St. Louis will build 150 coal and 150 flat cars at its own shops.

We are informed that the Chicago, Lake Shore & Eastern will get bids on 1,000 steel cars to be built of structural shapes.

We understand that the Wheeling & Lake Erie will rebuild 2,000 freight cars, 1,000 at its own shops and 1,000 by contract.

We are informed, but not officially, that the Wisconsin Central has ordered 500 box cars from the American Car & Foundry Co.

The Directors of the Chicago, Lake Shore & Eastern will be asked to authorize an order for 1,000 steel hopper cars of 40 tons capacity.

We understand that Barney & Smith has an order for two first-class, four third-class and two combination cars for the Vera Cruz & Pacific.

It is reported that the St. Joseph & Grand Island has ordered 64 stock cars from the Mt. Vernon Car Co. These cars were mentioned in our issue of Sept. 8.

We are reliably informed that the Chicago & Northwestern order for about 40 passenger cars, noted last week, has been placed with the Pullman Palace Car Co.

The Minneapolis, St. Paul & Sault Ste. Marie will probably soon be in the market for from 1,200 to 1,500 box, furniture and refrigerator cars, instead of 500 as noted last week.

We are officially informed that the 500 steel cars ordered by the Pittsburgh & Lake Erie from the Pressed Steel Car Co. are to be built on Lake Shore & Michigan Southern specifications.

It is reported that the Chicago, Rock Island & Pacific will build a large number of cars at its Horton, Kan., shops. We are officially informed that the matter is not yet fully determined.

The Wells & French Co. is building 100 Rodger ballast cars for the Chicago, Burlington & Quincy for October delivery. They will be equipped with Westinghouse air brakes, common sense bolsters, Monarch brake beams and McCord journal boxes and lids.

In our issue of Sept. 15 we noted that the Delaware & Hudson had ordered 500 coal cars. They will be built by the American Car & Foundry Co., and are for November and December delivery. They will be of 80,000 lbs. capacity, 37 ft. 11½ in. long, over end sills; 9 ft. wide, over side sills, and 4 ft. 3 in. high, from floor to top side; they will be built of wood, with wood underframes and equipped with American Steel Foundry Co.'s bolsters, Central brake beams, Diamond S brake shoes, Westinghouse brakes, Trojan couplers, Butler tandem draft rigging, McCord journal boxes and journal box lids, National Railway Spring Co.'s springs, Diamond trucks, cast iron wheels.

On Sept. 8 we noted that the St. Joseph & Grand Island would order some stock cars. On Sept. 22, 64 stock cars were ordered by this road from the Mt. Vernon Car Mfg. Co., for December delivery. These cars will be 37 ft. 1½ in. long, 9 ft. 5 in. wide and 8 ft. 5 in. high, and will weigh 31,000 lbs., with a capacity of 40,000 lbs. They will have metal underframes, Helmbacher axles, Cloud steel trucks, Bettendorf bolsters, Kewanee brake beams, Christie brake shoes, Westinghouse air brakes, Janney couplers. National end door fastenings, American continuous draft-rigging, McCord journal boxes and lids, Patterson-Sargeant paint and A. French Spring Co.'s springs.

We are reliably informed that the Duluth, Fremont & Norwalk electric cars, noted in our issue of Sept. 15, have been let to the Barney & Smith Car Co.

BRIDGE BUILDING.

ALAMEDA, CAL.—Bids are wanted Nov. 14 for building a double draw-span bridge across the tidal canal at Fruitvale Ave. W. H. Heuer, Major of Engineers, U. S. A., Oakland, Cal.

BALTIMORE, MD.—The Northern Central Ry., according to report, will build a bridge on Bellona Ave., over the railroad tracks.

The Baltimore & Potomac RR. proposes to build a new bridge over the tracks on Wilkens Ave. The avenue is 66 ft. wide and the bridge will cross four tracks.

BOND HILL, O.—The county will build the proposed iron bridge on Paddock Road over Ross Run. Estimated cost, \$10,235.

CENTREVILLE, PA.—Viewers have been appointed on a petition for a bridge over Armstrong's Run on the road to Grove City.

CHESTER, PA.—Viewers have recommended a bridge over Stony Creek on Second Ave., in Ridley Township.

CHICAGO, ILL.—At a meeting of the City Council on Sept. 18 Commissioner of Public Works McGann reported on the bad condition of all bridges, and the report was sent to the Committee on Rivers, Harbors & Bridges. It recommends an appropriation of \$10,000 for repairs. The Council ordered that a ferry be run 16 hours a day at the point where the Ninety-fifth St. bridge over the Calumet River collapsed.

CINCINNATI, O.—A resolution was introduced in the City Council Sept. 21 to have the proposed viaduct on Harrison Ave. built.

EVERETT, WASH.—The County Auditor will receive bids for building a 140-ft. Howe truss bridge across Rock Slough, with approaches.

EAGLE BRIDGE, N. Y.—Bids will be received at the County Supervisor's office in Hoosick Falls, N. Y., Sept. 30, for a steel bridge, 170 ft. long, 18 ft. wide and 5 ft. sidewalks. (June 23, p. 459.)

GALLIPOLIS, O.—Reports state that the Hocking Valley RR. is surveying for an extension that will necessitate a bridge across the Ohio either at this place or Point Pleasant.

GILROY, CAL.—The Council has in consideration two new bridges, one over the slough on South Monterey St., and one on Chestnut St. near Lewis St.

GRAND RAPIDS, MICH.—City Engineer Geo. M. Ames has prepared plans and estimates for the fixed spans and draws for the Bridge St. bridge and also for the Pearl St. bridge.

HAMILTON, MONT.—The Board of County Commissioners want bids for a bridge across the east fork of Bitter Root River at the Lund crossing.

INDIANA, PA.—The Grand Jury has recommended that Indiana County build the proposed bridge in Canoe Township. Jas. A. Crossman, Co. Clerk.

KANSAS CITY, KAN.—Bids are wanted Oct. 3 for an I-beam bridge over Wolf Creek in Delaware township. Leonard Daniels, County Clerk.

KANSAS CITY, MO.—The Belt Line RR. will build a bridge over Kansas Ave.

The Tenth Street Cable Railway Co. is contemplating a new bridge on Brooklyn Avenue across the tracks of the Kansas City Belt Railway. No plans have as yet been made.

KEMPTVILLE, ONT.—Bids are wanted for a steel bridge at Clougher's wharf.

KINGSTON, TENN.—The Tennessee Central, according to report, proposes to build a bridge across the Tennessee River for an extension.

LEWISBURG, PA.—Viewers have been appointed by the Union County Court on a petition for a bridge across Rapid Run, about one mile west of the mouth of Brush Valley Narrows. Elias B. Riehl, County Surveyor.

LOCKPORT, ILL.—The Board of Trustees of the Chicago Sanitary District opened 11 bids Sept. 20 for a bridge at Lockport. The Joliet Bridge & Iron Co. was the lowest bidder at \$20,975, the figures being 50 per cent. higher than former bids on account of the advance in the price of steel.

LYKENS, PA.—The Lykens & Williams Valley Electric Ry. Co. will build two viaducts over the Williams Valley RR., one in Lykens and one in Williamstown.

LYME, CONN.—The Directors of the New York, New Haven & Hartford at their annual meeting next month will consider changes in two drawbridges, one at Lyme, on the Shore Line, and one at Middletown.

MONTGOMERY, ALA.—Estimates for repairs and rebuilding bridges on the Western Ry. of Alabama for next year includes repairs and rebuilding of 5,080 lineal feet of bridges, requiring the use of 402,725 ft. of bridge lumber, and three new steel bridges.

NEW COLUMBIA, PA.—A bridge will be built over Gemberling's Run in White Deer Township. (See Lewisburg.)

OAKLAND, CAL.—G. L. Duncan, County Clerk, wants bids for building a bridge on the Merkeley ranch, about three miles below Elkhorn.

ORANGE, TEX.—The Comptroller has registered \$10,000 bridge bonds for new bridges in Orange County. (Sept. 8, p. 632.)

PATERSON, N. J.—Bids are wanted until Sept. 28, 8 P. M., for the new bridge at Main St. Philip Hartley, Chairman Committee on Main Street Bridge. George W. Botbyl, Clerk.

PHILADELPHIA, PA.—Ordinances were introduced in the Council Sept. 21 authorizing the construction of bridges at the following locations: On line of Fifty-seventh St. over Philadelphia & West Chester RR.; on line of Fifty-second St. over P. & W. C.; one line of Greenway Ave. over Baltimore & Ohio; on line of Seventy-first St. over Philadelphia, Wilmington & Baltimore; on line of Gibson Ave. over B. & O.

PITTSBURGH, PA.—The Director of Public Works informs us that the projected bridge across Haight's Run will not be built this year. (Sept. 22, p. 665.) It was voted last week to issue \$7,000,000 in bonds for the improvement of parks, erection of bridges, municipal hospital, building a filtration plant and extension of the boulevards.

PITTSFIELD, MASS.—The Boston & Albany will build overhead crossings at three places in this city. Plans have been decided upon.

PORTAGE DU FORT, QUE.—The Board of Public Works of the Dominion has had specifications made for the new bridge between the Island of Portage du Fort and the right shore of the River Ottawa—i. e., between the County of Pontiac, Province of Quebec, and the County of Renfrew, Ontario. It will be a steel structure, between 600 ft. and 800 ft. long, but the length is uncertain, as it is not settled whether the bridge should be built where the old structure stood or further down the stream. S. L. Brabazon, Provincial Land Surveyor.

REXFORD FLATS, N. Y.—Bids are wanted Oct. 3 at the office of John N. Partridge, State Superintendent of Public Works, Albany, N. Y., for building five steel trusses of about 41 ft. span each, for the Erie Canal aqueduct.

ROCKFORD, ILL.—The Board of Supervisors has voted an appropriation for the Auburn St. bridge across Rock River. Further action will not be taken until December.

ST. JOSEPH, MICH.—The Big Four, according to report, contemplates building a \$30,000 swing bridge across the St. Joseph River for a proposed extension.

SAN JOSE, CAL.—Eighteen bids on various designs, were received Sept. 11, for the bridge to cross the Coyote River at Julian St. The prices ranged from \$3,683 to \$7,582.

SAN FRANCISCO, CAL.—An 85-ft. iron bridge will be built over the railroad crossing at San Juan Ave. and Mt. Vernon St. at a cost of about \$18,000. The County Board of Supervisors propose to include in the tax levy an item of \$18,000 for this purpose. E. J. Morser, Asst. City Engr. (Aug. 18, p. 587.)

SANTA CRUZ, CAL.—The plans and specifications for the bridge over Noble gulch by N. Mosher have been accepted by the Board of Supervisors.

The Council has accepted plans and specifications for a stone arch on California St., across the Major Mill stream. H. H. Miller, Clerk to the Board of Suprs.

SAVANNAH, GA.—The drawbridge which the Savannah, Thunderbolt & Isle of Hope Ry. will build at Romesly Creek will be an 80-ft. swing draw. The draw at Skidaway Narrows will be a small structure of 20 ft. opening. No time is set for receiving proposals.

SHOSHONE, IDA.—The Clerk of the Lincoln County Board will receive bids until Oct. 2 for two bridges to be built over Big Wood and Little Wood Rivers. One will be of wood and the other iron, each 60 ft. long. A. J. McMahon may be addressed.

SUNBURY, PA.—The contract to build the bridge across the Susquehanna River at this place for the Sunbury Bridge Co., has been let to the Groton Bridge & Mfg. Co. for \$140,000.

TUSCALOOSA, ALA.—Willard & Cornwall, of Louisville, Ky., will, according to report, build the large drawbridge across the Black Warrior River, nine miles south of this place. (Feb. 24, p. 146.)

TWO HARBORS, MINN.—Lake County will build a bridge over Baptism River. Bids are wanted Oct. 3. John Olson, County Auditor.

WILKESBARRE, PA.—Luzerne County will build several steel bridges and about 17 stone arches next year. Plans for 12 of these were prepared in time for bids last June, but the year's appropriation was not sufficient. (Apr. 28, p. 303; June 23, p. 459.)

Other Structures.

ANDERSON, IND.—The Union Traction Co., Chas. L. Harry, Manager, proposes to build a new office building here.

The Republic Steel Co., of Anderson, Ind., will build a new rail mill at Youngstown, O. The ground at Anderson recently purchased will be occupied for doubling the puddling, the sheet and rolling mills and the 12-inch mill.

BAYONNE, N. J.—The Babcock & Wilcox Co. contemplates building a new plant at Bayonne.

BERKELEY, CAL.—Plans have been prepared by Mr. E. Benard, Architect, for the new building of the University of California. Martin Kellogg, President.

BUFFALO, N. Y.—The International Power Co. will build a new power house at this place. The structure will be of steel skeleton and 210 ft. wide by 605 ft. long.

BUTLER, PA.—The Davis Lead Company has been organized to build a plant to cost from \$250,000 to \$300,000, in Butler. All buildings will be of heavy construction and fire proof. The main building will be 225 x 140 ft. and 40 ft. high. Another of the larger buildings will be 84 x 180 ft. and four stories high.

CARTERSVILLE, GA.—An election will be held in November to decide upon building a new court house for Bartow County, at a cost of \$30,000.

CHARLESTON, W. VA.—The contract for building the annex to the State Capital has been let to Caldwell & Drake, of Parkersburg, W. Va., and Columbus, Ind. The bid was \$57,695.

CHICAGO, ILL.—The planing mill of the Illinois Car & Equipment Co., at Hegewisch, burned Sept. 20. The loss is estimated at \$150,000, fully insured.

COATESVILLE, PA.—The Coatesville Boiler Works will build two additional buildings, doubling its capacity.

COLUMBIA, S. C.—The Southern Ry., according to report, will build a new passenger station at Main and Assembly Streets, to cost about \$100,000.

CHATTANOOGA, TENN.—Levi & Griffith have the contract for building the new armory. It will be of brick, 60 x 145 ft., roof to be supported by five steel trusses covered with curved corrugated iron.

DES MOINES, IA.—The members of the East Des Moines School Board are considering plans for a new high school building; estimated cost \$50,000.

HARRIMAN, TENN.—The Southern Ry. will build a new passenger station here.

KENSINGTON, PA.—A new church and school building will be built by the Roman Catholic Church of the Ascension. Rev. D. J. Broughal, Rector.

LEVIS, QUE.—The Intercolonial Ry. will build a new station here.

MACON, GA.—English, Johnson & Co. have had plans prepared for a warehouse, estimated to cost \$30,000.

NEW KENSINGTON, PA.—The New Kensington Glass Bending Works will be enlarged to double the capacity.

NEW YORK, N. Y.—An apartment hotel will be built by Mr. W. Rafel, at Nos. 65 and 67 West Forty-fifth Street. It will be 12 stories high. Work will not be begun until spring.

The Committee of Architects appointed to pass upon the plans and specifications for the new Custom House in New York have selected two plans. These are by Messrs. Carrère & Hastings and Cass Gilbert. The Secretary of the Treasury has suggested certain modifications in the designs submitted to meet the needs of the service. The building will be seven or eight stories high, and will cost about \$2,750,000. The fronts will be in Bowling Green and State St.

Of the various bonds to be sold by the City on Oct. 3, \$1,950,000 is to pay for building the new Hall of Records, \$570,000 to pay for the plant of the Long Island Water Supply Co., \$1,500,000 to pay for the new aqueduct, \$400,000 for the sanitary protection of the watershed, \$1,000,000 for dock purposes and \$1,849,107 to pay for new street and park openings.

OTTAWA, ONT.—The Berlin Iron Bridge Co. of East Berlin, Conn., has the contract for furnishing the structural steel work for three buildings for the Ottawa Carbide Company, of Ottawa, Canada. The buildings are from three to five stories high, and consist of a furnace building, 80 ft. wide and 286 ft.

long, a grinding room, 38 ft. wide and 80 ft. long, and a breaking room 35 ft. wide and 80 ft. long, and two stories high. The floors are carried on steel beams and columns, and the flooring is steel plate. The trusses have a clear span, and the roofing is corrugated iron. The bins for the storage of material are all of plate iron. No woodwork is used anywhere in the construction of the buildings.

PETERSBURG, VA.—The Jas. P. McDonald Co. will receive bids until Sept. 30 for building 13 frame station buildings on the Richmond, Petersburg & Carolina.

PIPESTONE, MINN.—Bids are wanted on a county court house by Nov. 28. Address Wm. Doms, Chairman of the County Commissioners.

PITTSBURGH, PA.—Improvements will be made on the buildings at the Shoenberger plant to cost about \$40,000. A one-story iron building is to be built to take the place of one of the old mills. It will be 140 x 250 ft., and the structural iron work will cost \$24,000. A 2-story iron building, 18 x 120 ft., for use as a gas producer, will also be built at a cost of \$7,000, and a new iron blooming mill, 110 x 95 ft., will also be built, one story high, costing \$8,000.

The Best Mfg. Co., Twenty-fifth St. and Allegheny Ave., will build a new foundry to cost about \$100,000. See also "Bridge Building."

PITTSBURGH, PA.—Plans have been prepared for a new City Hall at Butler and North Main Streets.

POTTSTOWN, PA.—The Directors of the Warwick Iron & Steel Co. have authorized the Executive Committee, Edgar S. Cook, Chairman, and the Finance Committee, W. H. Sheldermine, Chairman, to build another blast furnace east of the present one at Pottstown.

READING, PA.—The Philadelphia & Reading will soon let the contract for building the new repair shops at Reading. (July 21, p. 529.) The new building will be 402 ft. long and 85 ft. wide. It will have four tracks, the two center ones to be equipped with pneumatic apparatus for handling cars.

SAVANNAH, GA.—The proposed Union Passenger Station, to be built by the Plant System, the Georgia & Alabama and the Florida, Central & Pennsylvania Railroads, is estimated to cost \$500,000. The Chief Engineer of the P. S. will prepare the plans.

SOUTH NORWALK, CONN.—W. B. Rider is the Engineer for a company which will build an ice plant and cold storage warehouse here.

STEUBENVILLE, O.—A new building will be built for the public library.

VANDERGRIFT, PA.—The Apollo Iron & Steel Co., Apollo, Pa., according to report, will build a new mill near this place.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Chicago & Northwestern.—Quarterly, preferred, 1½ per cent., payable Oct. 6.
Cincinnati, Hamilton & Dayton.—Quarterly, preferred A and B, 1 per cent., payable Oct. 3.
Dayton & Michigan.—Quarterly, preferred, 2 per cent.; semi-annual, common, 1½ per cent., payable Oct. 3.
Norfolk & Southern.—Quarterly, 1 per cent., payable Oct. 10.
Rio Grande Western.—Quarterly, preferred, 1½ per cent., payable Nov. 1.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Association of General Passenger and Ticket Agents.—The annual convention will be held at Boston, Mass., Oct. 17.

American Society of Civil Engineers.—Meets at the house of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month, at 8 p. m.

American Society of Railroad Superintendents.—The next meeting will be held at the Holland House, New York City, on Oct. 10.

American Street Railway Association and Street Railway Accountants' Association of America.—The annual convention is set for Oct. 17, at Chicago, Ill. T. C. Pennington, Secretary, 2020 State St., Chicago.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 716 Terry Building, Roanoke, at 5 p. m.

Association of Railway Superintendents of Bridges & Buildings.—The annual convention will be held Oct. 17, in Detroit, Mich. S. F. Patterson, Secretary, Concord, N. H.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7.30 p. m.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 10 a. m.

Chicago Electrical Association.—Meets at Room 1737, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, Secretary.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Tuesday of each month, excepting July and August, at 6.30 p. m.

Engineers' Club of Columbus, (O.)—Meets at 12½ North High street on the first and third Saturdays from September to June.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each

month, except in the months of July and August, at the Buffalo Library Building.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m.

Locomotive Foremen's Club.—Meets every second Tuesday in the club room of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7.30 p. m.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is Secretary.

American Society of Railroad Superintendents.

The next meeting of this Society will be held at the Holland House, New York City, on Tuesday, Oct. 10, at 10 o'clock in the forenoon. The chief subject for discussion will be "Examination of Employees," on which subject the Committee on Transportation has prepared a report.

Traveling Passenger Agents' Association.

This Association held its annual convention at Denver last week. The President for the ensuing year is Louis W. Landman, of the Columbus, Hocking Valley & Toledo, Detroit, Mich., and the Secretary is S. Van Dusen, of the St. Louis & San Francisco, Pittsburgh, Pa.

The American Railway Association.

The fall meeting of this Association will be held at the Waldorf-Astoria, New York City, on Wednesday, October 11, at 11 a. m. Reports will be presented by the Executive Committee and the Committees on Train Rules, on Car Service, on Safety Appliances, on Interlocking and Block Signals, on the Metric System, on Statistical Inquiry, on Revision of Rules of Order, and on Standard Dimensions of Box Cars. Three members of the Committee on Car Service and three members of the Committee on Safety Appliances are to be elected.

The American Society of Mechanical Engineers.

The monthly meeting of the Society, inaugurated last spring by the Juniors, will be resumed in October, and these meetings will be held during the winter and spring on the first Tuesday in each month except December, at the Society house, 12 West 31st Street, New York City. The first meeting will be held on Tuesday next, Oct. 3, when Mr. Henry E. Longwell will read a paper on the "Westinghouse Gas Engine." At the conclusion of the paper an informal discussion will be invited, which it is hoped will result in bringing out interesting points in gas engine practice.

Engineers Club of St. Louis.

A regular meeting was held Sept. 20, President Colby presiding. Sixteen members and four visitors were present. The paper of the evening entitled "Discipline," by Mr. Willard Beahan, was then read by the Secretary in the absence of the author. In this paper the relations that should be maintained between employer or superintendent and employees, were discussed, being divided under three heads: 1. The right of the men to be heard. 2. Their right treatment. 3. Wages.

Under the first it was maintained that a hearing should always be given the men, whether they came as individuals, committee or society, and that by so doing, the answer, whether acceding to their requests or not, if given with the reasons for it, would usually be gracefully accepted.

Under the second head, the necessity of seeing that the men's comfort and well-being be carefully looked after was set forth. Also that usually the head man should fare no better than the men if it is desired that they remain contented.

The question of wages was next considered and the adoption of a sliding scale of payment advocated, as in this way the most valuable men are gradually enabled to earn more and will thus be kept for long periods of time, to the benefit of their employers.

Mr. Beahan also went into the question of strikes, treating of their prevention and treatment after occurring.

The discussion following was participated in by Messrs. Bryan, Fish, Borden, Bouton, Colby and Van Ornum.

Western Railway Club.

A meeting of the Western Railway Club was held Tuesday afternoon, September 19, at the Auditorium Hotel, Chicago. The Secretary read the names of 14 new members and stated that, at the October meeting, a Committee on the general subject of specifications would present a report. It was decided not to have a banquet this year, but instead furnish each member with a bound volume of the Western Railway Club Proceedings at the end of the year, and the unbound proceedings of the other railroad clubs. The appointment of Mr. J. W. Taylor as Secretary, to succeed Mr. F. M. Whyte, was announced.

A paper, "Locomotive Front Ends," by Mr. J. Snowden Bell, Patent Attorney, Pittsburgh, was presented and brought out considerable discussion from those using long extension fronts. On account of Mr. Bell's absence from the meeting, and there being none of the advocates of short fronts present, the discussion was not so lively as might be expected.

The paper first reviewed historically and illustrated the principal front end arrangements, which review included examples of present practice. The changes of opinion in the past regarding this detail were shown by extracts from various papers and discussions before mechanical societies and the patent records, while recent letters from railroad men showed in a similar way present opinion. The conclusions reached in the paper were that a smokebox of greater length than is necessary to permit the use of a sufficient area of netting to provide for free steaming is not only useless, but also positively prejudicial as to the steaming of the engine and economy of fuel; with boilers of the present average size the length from the center of the exhaust pot to the front should not exceed 35 in. The front end should be of the "self-cleaning" type and without the usual cinder pot or hopper. Where an open stack is used, the taper or "choke" pattern, where properly designed and proportioned, will be found to be superior to the straight, cylindrical stack. The construction recommended by the Master Mechanics' Association at its 1894 and 1896 conventions embodies, as a whole, the most desirable features of a locomotive front end, but under certain conditions a diamond stack and short front end is equally effective. The useful and economical effect of a locomotive front end decreases as the length of the smokebox is increased beyond that necessary for the application of the draft appliances. Experimental research could well be made to ascertain just how much reduction of smokebox length is practicable, and whether a practicable arrangement could be made for returning the cinders to the firebox.

In the discussion of the paper Mr. A. E. Manchester, of the Chicago, Milwaukee & St. Paul, held that self-cleaning front ends were dangerous on account of a supposed greater liability of starting fires along the right-of-way. He further thought that the cinders discharged from the stack would enter the rear cars of the train and be objectionable to passengers, also disagreeing with the paper in that the long extension fronts were uneconomical of fuel. On the Chicago, Milwaukee & St. Paul, it was stated that from 10 to 20 bushels of cinders were removed from the extension fronts of locomotives at terminals, and it was thought most of the cinders were collected during a run of from 50 to 70 miles. Presumably for longer runs the cinders go out the stack as with the short fronts. Mr. J. F. Deems, of the Chicago, Burlington & Quincy, stated that he had made some tests of blowing cinders with an air blast against a board set with spikes, and had been unable to break them up with a blast similar to that in the front end of a locomotive. He did not think favorably of recent arrangements where projections were depended on to grind up and extinguish the sparks. Mr. F. Slater, of the Chicago & Northwestern, said the extension front for retaining sparks usually impressed a jury favorably in suits brought to collect damages on account of fires. Mr. William Forsyth suggested that a remedy for setting fires with locomotive sparks was to be found in the use of large grates enabling so mild a blast to be used that cinders would not be drawn from the firebox. Making the rate of combustion 100 lbs. of coal, or less, per square foot of grate, would accomplish this and at the same time greatly increase the efficiency of the boiler.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. Joseph Kaylor, General Manager of the Pittsburgh Forge and Iron Co., died Sept. 11, at Allegheny, Pa. Mr. Kaylor was born in Freeport, Pa., in 1838.

—Mr. W. H. Harrison, who in March last resigned as Superintendent of Motive Power of the Trans-Ohio Division of the Baltimore & Ohio (see "Personals," March 17, p. 196) died Saturday at Newark, O.

—Mr. Charles J. Hepburn, at one time Receiver for the Evansville & Terre Haute RR., died Sept. 19. Mr. Hepburn was born in Williamsport, Pa., in 1841, and up to sixteen years ago was a prominent figure in railroad circles when, owing to ill health he was obliged to resign.

—Mr. Franklin A. Wilson, President of the Maine Central RR., has announced his intention of resigning from the Presidency of this company. Mr. Wilson says that his reasons for resigning are purely personal, and it is believed that he has refused the re-election in order to devote himself wholly to his professional obligations.

—The members of the Committee of the Isthmian Canal Commission, which went to Paris a few weeks ago, will shortly be back in the United States. Mr. Morison arrived last Saturday and Admiral Walker, Colonel Hains, Mr. Noble and Mr. Burr are due this week on the New York. General Ernst will remain in Europe a little time longer.

—Mr. S. F. Forbes, who recently resigned as Purchasing Agent of the Great Northern to become Assistant Superintendent of Motive Power of the Central Railroad of New Jersey, began his railroad career in 1881 as Time-keeper in the shops of the Chicago & Northwestern, and later served as Assistant General Store-keeper on the same road. From there Mr. Forbes went to the Great Northern as General Store-keeper, later becoming Superintendent of Shops and finally Purchasing Agent.

—Mr. James Morton, General Passenger and Ticket Agent of the Burlington, Cedar Rapids & Northern, died at Cedar Rapids, Ia., Sept. 23, from paralysis. Mr. Morton was born in 1843 at Elba, N. Y., and was educated at the Washington St. Academy of Geneva, N. Y. He entered the service of the railroad in 1872 as a clerk on the Chicago & Northwestern. In 1894 he was appointed General Passenger and Ticket Agent of the B., C. R. & N., which position he held at the time of his death.

—Mr. Roswell Miller, the retiring President of the Chicago, Milwaukee & St. Paul, who at a recent meeting of the stockholders was elected Chairman of the Board, began railroading on the Cairo & Vincennes, of which he was Secretary and General Superintendent. In 1882 he was Second Vice-President and Treasurer of the Chicago & Western Indiana. From there Mr. Miller went to the C., M. & St. P. as Assistant to the General Manager, and in 1884 became Assistant General Manager, later General Manager and finally President.

—Mr. Albert J. Earling, who has just been elected President of the Chicago, Milwaukee & St. Paul, was born in Richfield, Wis., in 1848. Mr. Earling began his railroad career with this company in 1866 as Telegraph Operator and has since passed through the various grades as Train Dispatcher, Assistant Superintendent, Division Superintendent, Assistant General Superintendent, General Superintendent and General Manager. In 1895 he became Second Vice-President, which position he held up to the time of his election as President. His career has been very unusual in that he has always served the one road and has served it in so many grades.

—Mr. Elbridge G. Allen, who was General Superintendent of the Old Colony RR., from 1893 to May 1, 1898, shot and killed himself at the Grand Union Hotel in New York City last Monday. No explanation of the act is given, though some of Mr. Allen's acquaintances speak of unpleasant family relations, and it is said that he has speculated somewhat in railroad stocks, and had lately lost a good deal of money. Since leaving the Old Colony road Mr. Allen had done some railroad work for New York investors. Mr. Allen was born in Sweden, Me., May 14, 1850. After working in various capacities on railroads, also in steamboating and other lines of work, he became Superintendent of the Massachusetts Central in 1880. In 1883 he was Superintendent of the Ohio River RR., then went to the New York & New England, and in 1887 went to work for the New York, New Haven & Hartford. From there he went to the New York Central and was Superintendent of the Hudson Division of that road for a few months in 1890; but he soon went back to Boston. The rest of his railroad life was spent on the Old Colony and its successor, the New York, New Haven & Hartford. In 1890 Mr. Allen built two sleeping cars on what was called the "zig-zag" plan, and these cars for several years were run on the Shore line between New York and Boston. These cars, described in the Railroad Gazette of Oct. 31, 1890, have alternate wide and narrow sections, the wide ones being partitioned off so as to make staterooms, and the narrow ones being fitted up in the ordinary way.

ELECTIONS AND APPOINTMENTS.

Atlanta, Knoxville & Northern.—John B. Newton, Chief Engineer, has been appointed Acting General Manager, succeeding Joseph McWilliams, General Manager, resigned owing to ill health.

Central of Georgia.—B. H. Watson, heretofore Supervisor at Albany, Ga., has been appointed Supervisor at Euftaula, Ala., succeeding G. C. Raoul, resigned.

Central RR. of New Jersey.—S. F. Forbes, heretofore Purchasing Agent of the Great Northern, has been appointed Assistant Superintendent of Motive Power of the C. R. of N. J., with headquarters at Jersey City, N. J. Effective Sept. 21.

Chicago, Milwaukee & St. Paul.—At a meeting of the stockholders held in Milwaukee Sept. 23, Roswell Miller was elected Chairman of the Board and A. J. Earling, heretofore Second Vice-President, was elected President, succeeding Mr. Miller.

Chicago Transfer & Clearing Co.—This company, recently incorporated to own and manage the Stickney tract, the proposed great freight transfer station at Chicago, has elected the following officers: President, Edwin W. Winter; Treasurer, C. W. Hillard (Treasurer of the Chicago & Eastern Illinois); Secretary, Ralph Isham.

Cincinnati, Hillsboro, Jackson & Gallipolis.—The officers of this company, referred to in the Construction column, are: President, M. McKeenan, Hillsboro, O.; Vice-President, Moses Morgan, Jackson, O.; Treasurer, Capt. C. Gillilan, Portsmouth, O., and Civil Engineer, J. W. Jones, Gallipolis, O.

Cleveland, Cincinnati, Chicago & St. Louis.—L. S. Rose, heretofore Supervisor of the Cincinnati Division, has been appointed Acting Engineer Maintenance of Way of the Cincinnati-Sandusky Division. (See Elections and Appointments, Sept. 22, p. 667.)

Connecticut River.—W. A. McClench has been elected a Director, succeeding J. A. Hall.

Corvallis & Southern.—The officers of this company, referred to in the Construction Column, are: President, G. C. Millet; Vice-President, A. Wilhelm; Treasurer, C. W. Washburne; Secretary and General Manager, H. S. Wallace.

Ft. Worth & Rio Grande.—C. H. Burk has been appointed Master Mechanic pro tem.

Kansas City Suburban Belt.—L. F. Moore has been appointed General Freight Agent, with headquarters at Kansas City, Mo.

Lehigh Valley.—At a meeting of the stockholders, held Sept. 20, William C. Alderson, heretofore Purchasing Agent, was elected Treasurer, succeeding J. Andrew Harris, Jr., resigned.

Mexico, Cuernavaca & Pacific.—J. M. Brash, Auditor, with headquarters at Mexico, Mex., has resigned.

Mobile & Ohio.—J. J. Eddy has been appointed General Traveling Agent, with headquarters at 421 Olive St., St. Louis, Mo.

Nashville, Chattanooga & St. Louis.—We are informed that L. K. Wenning, Auditor of Receipts, has not resigned, as stated last week (p. 667).

New York & Harlem.—W. S. Crane has been appointed Assistant Treasurer and Assistant Secretary.

New York, New Haven & Hartford.—Jacob W. Miller, who on July 20, assumed charge, until further notice, of all matters heretofore under the jurisdiction of the late S. A. Gardner, General Superintendent of Marine District (see Elections and Appointments July 28, p. 547) has been appointed General Superintendent of the Marine District, with headquarters at Pier 19, North River, New York, effective Oct. 1.

Salt Lake & Ogden.—J. H. Kirk, Master Mechanic, will also assume the duties of General Superintendent, with headquarters at Salt Lake City, Utah.

United Counties.—Percy Evans has been appointed Accountant and Auditor, with headquarters at St. Hyacinthe, Que., succeeding H. Upton.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALBERT LEA & SOUTHERN.—This company has been incorporated in Minnesota with a capital stock of \$100,000 to build a railroad from Lyle, Mower County, to run northwest about 30 miles to Albert Lea, connecting two branches of the Chicago, Milwaukee & St. Paul. The incorporators are: Wm. A. Morin, Wm. E. Todd, Bissell J. Humphrey, Clarence W. Moore and Henry B. Litchfield.

ARIZONA ROADS.—Dr. J. M. Ford of Phoenix, Ariz., on Sept. 15, filed papers with the Territorial Secretary stating his intention to build a narrow-gauge line from Phoenix southwest 130 miles via Gila Bend, on the Southern Pacific, and the Ajo mines to Quitovaquito, Mex., thence 53 miles more to a small harbor on the northern end of the Gulf of California. He also proposes to build from Phoenix northeast 105 miles to Jerome, thence about 100 miles to the Grand Canyon. A third line will run from Phoenix east about 175 miles to Globe and Morenci. Much of the line has been surveyed.

Attorney C. F. Ainsworth has filed a declaration of intention to build a broad-gauge road from Sentinel, on the Southern Pacific, to run east about 200 miles via Phoenix to Solomonville thence to Railroad Pass, another point on the Southern Pacific, which is thought to be back of the project.

ASHLAND & WOOSTER.—The company has opened its road for freight business on a section between Ashland and Wooster Junction, O., near Shreve, on the Pittsburgh, Fort Wayne & Chicago, running north about 40 miles, via Horav, Funct, Jeromeville, and England, to Ashland. The road as projected is from Jewett, O., west about 52 miles, to Ashland. H. B. Camp of Akron, O., is President. (July 21, p. 530.)

ATCHISON, TOPEKA & SANTA FE.—Grading is reported begun on 24 miles of the Eastern Oklahoma extension from Guthrie, Okla., northeast via Perkins, Stillwater and Pawnee, to Coffeetown, Kan. (Aug. 18, p. 588.)

Arrangements are reported being made to reduce grades between Temple, Tex., and Lealy.

BISMARCK & POTOMAC VALLEY.—An officer writes that a consolidation of this line with another road is under consideration. The road as projected is from Davis, W. Va., east through Winchester, Va., and Harper's Ferry. Surveys are made. Fred M. Leonard, 119 South Fourth Street, Philadelphia, is attorney. (Jan. 13, p. 33.)

BOISE, NAMPA & OWYHEE.—Grading is begun, according to report, on the extension from Nampa, Ida., north toward Lewiston. The people of Caldwell offer to add the line, providing it is run through their city.

BRADFORD, BORDELL & KINZUA.—This company, according to report, is replacing its ties preparatory to making the line standard gauge. The road runs from Bradford, Pa., to Smethport, 25.23 miles, with a branch to Rew City, 1.93 miles.

CANADIAN NORTHERN.—Work is being pushed rapidly on the Ontario & Rainy River line from Port Arthur, Ont., west into Manitoba. Between 5,000 and 6,000 men are at work and a stretch of 150 miles from Stanley southwest toward Rainy River. In order to complete the road by September, 1900, work will be continued all winter. At Port Arthur men have been putting the company's docks in shape for the rapid handling of trains. Rails are to be hauled from that point over the Port Arthur, Duluth & Western route to Stanley, where 20 miles are ready for rails. (Sept. 8, p. 633.)

J. W. Buchanan, one of the contractors for the Manitoba & Southeastern extension, has reached a point with his grading outfit 15 miles north of the International boundary. Track laying has been delayed on account of the scarcity of rails; but the company hopes to have the road completed from Winnipeg to the boundary before winter. (June 23, p. 461.)

CANADIAN PACIFIC.—Regular train service is begun on the Columbia & Western extension, between Robson, B. C., and Grand Forks. The line will be completed into Midway, 105 miles west of Robson, in a few weeks, and this is to be the terminus for some time. It is proposed to increase the force to 10,000 men.

Track has been laid this season on the Pipestone branch from Reston, Manitoba, west 18 miles, to Antler. The contract calls for completion of the line of 50 miles from Antler by Nov. 10. Geo. H. Strevel has the contract. (Aug. 11, p. 574.)

CANE BELT.—See Railroad News column.

CAROLINA NORTHERN.—About nine miles is graded, the bridge over Lumber River completed and about three-quarters of a mile of track laid, according to report, on this line from Lumberton, N. C., south 45 miles, to Marion, S. C., both on the Seaboard Air Line, which is supposed to be back of the project. Albert A. Sparks of Lumberton, N. C., is President. (June 23, p. 460.)

CENTRAL, OF GEORGIA.—Track is reported laid in Andalusia on the Seaboard branch extension from Seaboard, Ala., southwest 13 miles via Christine to Andalusia. (Sept. 22, p. 667.)

CHATTANOOGA, AUGUSTA & CHARLESTON.—Application was made in Georgia, Sept. 14, for a charter for this company, with a capital stock of \$500,000, to build a railroad in the interest of the Seaboard Air Line from Augusta, Ga., northwest about 210 miles, to the Tennessee State line and thence to Chattanooga, Tenn. The incorporators are: Joseph M. Brown and J. J. Spalding of Atlanta, Ga.; Goodwyn Rhett, C. Wulbum, W. B. Chilsolm and George W. Williams, of Charleston, S. C.; A. H. Hodgson, of Athens, Ga.; Edmund R. Williams and S. W. Travers, of Richmond, Va.; James U. Jackson, Charles S. Heard, Thomas W. Alexander, Paul Mustin, F. E. Fleming, Boykin Wright and J. D. Dawson, of Augusta, Ga.

CHICAGO & NORTHWESTERN.—Location of the double track has been made through the town of Ames, Ia., beside the old line. On account of heavy grades on the east and west of the city, extensive fills will be required. (July 7, p. 499.)

Work was begun last week in double tracking the line between Lamolille, Marshall County, Ia., and

Ontario, 33 miles. The orders are to complete as much as possible before winter sets in. It was not expected to do any double tracking this year west of Lamolille.

D. D. Streeter has the contract for building a branch from Tyler, Minn., to run northwest about 30 miles to Lake Hendricks, Minn.

CHICAGO & WABASH VALLEY.—This company's line is completed from Comer, Ind., south five miles to Pleasant Grove. Of this one-half is graded and one-half a mile of track is laid. The route of the line is from Kersey, Ind., via Zadoo, Smithfield, Gifford, to Comer, Ind., 15 miles. Benj. J. Gifford, of Kankakee, Ill., is President. (Official.)

CHICAGO, MILWAUKEE & ST. PAUL.—Grading is progressing rapidly on the extension from Fonda, Ia., to Spencer, and track laying is to be begun this week. Track will also be laid on the line from Rockwell City, Ia., to Sac City. The most of the grading is completed to Storm Lake. It is expected to have both of the extensions ready for trackage by Nov. 1. (Aug. 18, p. 589.)

CHICAGO, OHIO & GULF.—T. J. Adams of Montgomery, Ala., is making preliminary surveys for this proposed line from Tuscaloosa, Ala., on the south side of the Tennessee River near Florence to run south about 417 miles via Faunsdale and Linden to Horn Island, not far from Scanton, Miss. Building of the first 20 miles is to be begun at Faunsdale, which is the headquarters.

CINCINNATI, HILLSBORO, JACKSON & GALLIPOLIS.—The route of this proposed line, successor to the Cincinnati, Hillsboro & Wellston, is from Cincinnati, O., east 157 miles, via Milford, Newtonville, Fayette, Dodsonville, Hillsboro, Marshall, Sinking Springs, Latham, Idaho, Jasper, California, and Jackson, to Gallipolis. Another proposed route is from Jackson to Vinton, and thence by the Hocking Valley to Gallipolis. Preliminary surveys from Milford to Jackson, 109 miles, have been made by P. H. Doyle, C. E., of Columbus, O. The sharpest curve of this section is 955 ft. radius and the maximum grades 42 ft. per mile against west bound traffic and 53 ft. per mile against east-bound traffic. Fully 90 per cent. of the right of way can be obtained free and the rest secured at the rate not to exceed \$30 per acre for land actually appropriated. Terminal facilities in Cincinnati will be arranged for with the new belt line now projected to all parts of the suburbs. Right of way through the corporation limits of Jackson will be granted free. The above is taken from a report by J. W. Jones, C. E., of Gallipolis, O. The officers are given under Elections and Appointments. (C. H. & W., March 3, p. 161.)

CLEVELAND, CINCINNATI & CHICAGO.—An officer writes that there is no contemplated extension, as reported, of the company's yards at Louisville, Ky. (Sept. 22, p. 667.)

COLUMBIA SOUTHERN.—Grading is to be begun at once, according to report, on the extension from Moro, Ore., south about 43 miles, to Antelope. Surveyors have been in the field all summer and cross-sectioning is completed as far as Cross Hollows. An easy grade has been found, with comparatively light cuts and fills. The road is to be ultimately extended to Prineville, 95 miles south of Moro. E. E. Lytle of Moro, is President. (June 9, p. 417.)

COLUMBUS, MARSHALL & NORTHEASTERN.—Bonds have been sold, according to report, for building this line from Marshall, Mich., north about 140 miles via Olivet, Kalamazoo, Vermontville and Alma to Bay City. H. E. Hollon of Marshall, Mich., is President. John Seymour of Hudson, Mich., has the contract. (Aug. 4, p. 560.)

CORVALLIS & SOUTHERN.—The route of this proposed line, whose incorporation was recently noted (Sept. 8, p. 633), is from Corvallis, Ore., south via Monroe and Junction, to Eugene, and thence southwest to Coos Bay; in all about 120 miles. The final survey is not made. The road will be built from Junction to Corvallis, 27 miles, first. There will be no steel bridges, but about 5,000 ft. of trestle on the first 27 miles. The officers are given under Elections and Appointments. (Official.)

DAKOTA PACIFIC.—Eight miles of grading is reported entirely completed, and 75 per cent. of all the grading done on this line from Rapid City, S. D., west 33½ miles, to Mystic, on the Chicago, Burlington & Quincy. The rails are 65 lb. weight. W. T. Coad of Rapid City, S. D., is President. (Aug. 18, p. 589.)

DAVENPORT, CLINTON & EASTERN.—J. M. McDonald & Co., of New York, contractors, are pushing the grading on this line from Davenport, Ia., northeast 35 miles, via Le Claire, Princeton, Comancha, to Clinton, Ia. Track laying is to be begun this week. H. B. Schuler, of Davenport, Ia., is President, and C. D. Dearborn Chief Engineer. (Aug. 25, p. 603.)

DETROIT & LIMA NORTHERN.—Permission has been asked to spend \$300,000 on rolling stock and track improvements.

EUREKA SPRINGS.—See Railroad News column.

FRANKLIN & MEGANTIC.—Wm. D. Smith, of Bangor, Me., is reported to have the contract for the extension for five miles from Carrabasset, Me., north to Crockertown. A. F. Hilton, of Carrabasset, is in charge of construction. (Sept. 15, p. 649.)

GRAND TRUNK.—Extensive changes, as already noted (Sept. 1, p. 619), are being made at Murray Hill and east of Trenton, Ont., to overcome the heavy grades at these points. It is expected that double tracking this section will be completed in about three weeks. The Trenton yards are to be raised 10 ft.

This company is reported making extensive improvements on the line in the vicinity of Vaudreuil, Que., including the raising and leveling of the road-bed.

GREAT NORTHERN.—Final surveys are reported completed for the cut-off around Chuckamut Mountain, from Fair Haven, Wash., south along the water front, to a point two miles above Burlington. It is reported that building will be begun at once. (Sept. 1, p. 619.)

President Hill is reported as stating to the people of Spokane, Wash., that he will spend from \$600,000 to \$1,000,000 in improving the terminals at that city.

GULF, BEAUMONT & KANSAS CITY.—This company, according to report, has accepted a proposition from the citizens of Jasper, Tex., and will let contracts at once for extending the line from its present terminus, Rogan, north to that city. (Aug. 18, p. 589.)

HOCKING VALLEY.—An officer writes that his company is desirous of making a track connection with the Chesapeake & Ohio, and that the surveys are now in progress to ascertain the best route. The first survey from Gallipolis, O., southeast to Scary, W. Va., is completed. The second from Gallipolis south to Huntington, W. Va., is now in progress and will require several weeks more to complete, after which a third survey, from a route not yet determined, will be made and the estimates of the cost, etc., will have to be completed before any conclusion can be reached. (Sept. 22, p. 668.)

ILLINOIS CENTRAL.—The cut-off on the Walla-hatchie branch of the Yazoo & Mississippi Valley between Black Bayou and Phillip, Miss., has been opened for freight traffic. (March 31, p. 235.)

KINGSTON & PEMBROKE.—A three-mile branch is being built, according to report, from the main line at Calabogla, Ont., to Caldwell's iron mine.

KNOXVILLE & BRISTOL.—Grading is to be begun the first of next month, according to report, on the extension from Blaine, Tenn., northeast 18 miles, to Knoxville. Preliminary surveys are completed and final surveys are to be begun soon. (Aug. 18, p. 589.)

LINVILLE.—This line, successor to the Linville River, from Cranberry, N. C., southeast 14 miles to Pineola, is completed. Isaac T. Mann, of Bramwell, W. Va., is the incorporator of the new company. (Aug. 18, p. 589.)

LITTLE ROCK, HOT SPRINGS & WESTERN.—Grading is reported begun on the line of this company, successor to the Little Rock, Hot Springs & Texas. The line as projected is from Little Rock, Ark., southwest 53 miles, via Van Benton, to Hot Springs. Much of the grading was done some time ago. (Aug. 4, p. 561.)

MENOMINEE & ST. PAUL.—Work is begun, according to report, at Menominee, Mich., on the belt line to be used by this company and the Ann Arbor. The M. & S. P. was recently incorporated to build from Menominee west, 300 miles, to St. Paul. W. R. Burt, of Saginaw, Mich., President of the Ann Arbor, is an incorporator. (Sept. 15, p. 650.)

MILWAUKEE TERMINAL & WESTERN.—This company will ask the city of Milwaukee, Wis., to vote a bonus of between \$500,000 and \$750,000 for this proposed line from that city, southeast about 200 miles. J. W. Wegner, of Milwaukee, is interested. (July 14, p. 515.)

MONTFORT COLONIZATION.—H. L. Leclair, of Montreal, Que., has been appointed by the Provincial Government to survey the Montfort & Gatineau extension from Armidale, Que., to Gatineau, 85 miles.

MT. PLEASANT & SOUTHERN.—This company has been incorporated in Tennessee with a capital stock of \$40,000 to build a railroad connecting Ridley and Atilla, both on the Nashville, Florence & Sheffield line of the Louisville & Nashville. The incorporators are: Herman Ruhm, John D. Ruhm, Jr., Geo. G. Blackie, E. L. Gregory and J. C. Ingram.

NORFOLK & WESTERN.—With reference to the report that a three-mile branch is being built by this company to the Griffin iron mines, in Roanoke County, Va., the General Manager writes that the company is building no branches. (Sept. 15, p. 650.)

NORTHWESTERN RAILROAD OF SOUTH CAROLINA.—Grading is practically completed to Scarborough on this line (successor to the Wilson & Summerton) from Wilson, S. C., north 31 miles to Camden. Grading will not be extended beyond Scarborough until the route to Camden is determined. Thos. Wilson of Wilson, S. C., is President. (June 30, p. 483.)

NOVA SCOTIA SOUTHERN.—C. B. Wilkins & Co., of Yarmouth, N. S., contractors for this line, are prepared to sublet the contracts for work between the northern end of the road and the Indian gardens. The road as projected is from Annapolis, N. S., to Liverpool, with several branches. Robert G. Hervey, 80 Broadway, New York, is interested. (Sept. 8, p. 633.)

OREGON RR. & NAVIGATION.—An officer writes that there is nothing in the report that this company will build a new passing siding 2,700 ft. long at Baker City, Ore. (Sept. 15, p. 650.)

PERE MARQUETTE.—This company was incorporated in Michigan Sept. 21, with a capital stock of \$1,400,000, to build a line from Pentwater, Mich., north 35 miles, to Manistee. The incorporators include directors of the Flint & Pere Marquette, the Detroit, Grand Rapids & Western and the Chicago & West Michigan. It is thought that the company will form the basis for the consolidation of these three companies as already noted. (News column, Aug. 11, p. 576.)

PHILADELPHIA & READING.—The double tracking on the Little Schuylkill branch between East Mahanoy and Port Clinton, Pa., is reported practically ready for travel. (June 23, p. 461.)

Plans are being prepared, according to report, for a new freight yard on Callowhill Street, Philadelphia, between Sixteenth and Seventeenth Streets.

PICKENS & HACKER VALLEY.—This company has been incorporated in West Virginia with a capital stock of \$100,000, to build a railroad from Pickens, on the West Virginia & Pittsburgh, to run west about 10 miles, to Hacker Valley. Among the incorporators are H. Spies, Lina Spies, E. F. Kummel, of Pickens; and A. C. Mace and E. J. Mace, of Hacker Valley.

QUINCY & EASTERN.—This company was incorporated in Illinois Sept. 22, with a capital stock of \$2,000,000 to build the road already noted under this title (April 14, p. 272) from Quincy, Ill., east via Rushville, to Beardstown and Havana. The incorporators are: Lewis B. Tebbetts and Arthur P. DeCamp of St. Louis, Terre A. Clark, A. M. Clark and Milton Weems, Quincy, Ill.; and D. V. Youngblood of Carbondale, Ill.

RADFORD SOUTHERN RAILROAD & MINING.

—This company was incorporated in Virginia Sept. 13 to build a railroad from Radford, southeast about 40 miles through Floyd County to Stewart, on the Danville & Western, line of the Southern, or about an equal distance east to Rocky Mount, on the Norfolk & Western. Geo. W. Miles of Radford is President and W. R. Whorton, Secretary.

RICHMOND, PETERSBURG & CAROLINA.—General Manager Negley is reported as saying that all the grading from Ridgway, N. C., north to Petersburg, Va., will be finished by Oct. 10, and that much of the grading between Petersburg and Richmond is completed. The entire line to Richmond, it is expected, will be finished by Jan. 1. It is to be used as an extension of the Seaboard Air Line. (Sept. 15, p. 650.)

SAN FRANCISCO & SAN JOAQUIN VALLEY.—This company is building a spur 4,700 ft. long to Lucerne Vineyard, near Hanford, Cal.

SISTERSVILLE, PENNSBORO & BURNSVILLE.—Bonds to the amount of \$1,400,000 are reported sold for building this line from Sistersville, W. Va., south 75 miles, via Pennsboro, to Burnside, on the West Virginia & Pittsburgh. L. P. Wilson is President and R. C. Venable, Chief Engineer, both of Pennsboro, W. Va. (March 17, p. 198.)

SOUTH CAROLINA & GEORGIA EXTENSION.—A contract is reported let to grade 10 miles of this line between Marion and Johnson City, Tenn. The company was formerly part of the Ohio River & Charleston.

SOUTH HAVEN & EASTERN.—Surveys are reported in progress for the Saugatuck & South Haven extension from South Haven, Mich., north 22 miles, to Saugatuck. The S. & S. H. was incorporated in December last. (Dec. 23, 1898, p. 924.)

SUMPTER VALLEY.—J. A. West, Chief Engineer of the Utah & Pacific, according to report, has begun surveys for the proposed extension of this line from Sumpter, Ore., southwest, into the Harvey County stock region. (March 17, p. 198.)

SWAN VALLEY & COLUMBIA.—This company has been incorporated in Tennessee with a capital stock of \$10,000, to build a railroad from the mouth of Swan Creek on Duck River, to run along the Duck River Valley, to Columbia. The incorporators are: R. H. Wright, C. C. Christopher, J. A. Bates, W. M. Bates and John A. Pitts.

TILSONBURG, LAKE ERIE & PACIFIC.—The people of Ingersoll, Ont., have voted a bonus of \$25,000 for the proposed extension from Tilsonburg, north about 20 miles, to that city. The road now runs from Port Burwell, Ont., north 16 miles, to Tilsonburg.

WELLSBURG & WHEELING.—This company was incorporated in West Virginia Sept. 21, to build a railroad from Lazearville opposite Wellsburg, O., to run south along the bank of the Ohio, about 25 miles, to Wheeling, paralleling the Pittsburgh, Cincinnati, Chicago & St. Louis. The incorporators are: J. A. Miller, William A. Wilson and Alfred Paul, of Wheeling; Charles A. Weaver, of Moundsville; Edward M. Atkinson, of Elm Grove; Robert McCormick, of Sistersville; and Samuel George, of Wellsburg.

WINONA & WESTERN.—The Winona Construction Co. is reported to have taken a contract for the proposed extension from Simpson, Minn., north 7.55 miles, to Rochester, on the Chicago & Northwestern.

YANKTON, NORFOLK & SOUTHERN.—Bonds are reported placed for this line from Norfolk, Neb., north about 75 miles to Yankton, S. D. Much of the grading was completed some time ago. Graham & Roby, of Norfolk, O., own the line. (Sept. 22, p. 668.)

YUMA & GULF OF CALIFORNIA.—Capt. Alfonso B. Smith of Los Angeles, Cal., is to begin surveys at once, according to report, for this proposed line from Yuma, Ariz., southeast about 75 miles into Mexico to the Adair Bay at the head of the Gulf of California. He obtained concession from the Mexican government some months ago; but it was at first proposed to build the line to San Jorge, another point on the Gulf of California. (Dec. 23, 1898, p. 924.)

GENERAL RAILROAD NEWS.

CANADIAN PACIFIC.—Canada Central 5 per cent. first mortgage bonds, comprising 16 bonds of £500 each and 54 bonds of £100 each, will be paid at the rate of £105 per £100 bonds on Oct. 2, at Speyer Bros., 7 Lothbury, London, E. C.

CANE BELT.—The Texas Railroad Commission on Sept. 12 authorized the company to issue bonds to the amount of \$12,000 per mile on the line from Sealy, Tex., to Bonus, 28 miles. Of this, 11 miles, from Bonus to Eagle Lake, is under operation and the other 17 miles to Sealy, is graded and ready for the rails. (Railroad Construction column, July 28, p. 547.)

CENTRAL OF GEORGIA.—Judge Hart, at Eatonton, Ga., on Sept. 18, decided against the suit of the State of Georgia to annul the purchase of the Middle Georgia & Atlantic by the C. of G., now known as the Eatonton branch. The M. G. & A. runs from Milledgeville to Covington, Ga., 64.57 miles, and was bought by the C. of G., Jan. 1, 1897.

CENTRAL PACIFIC.—Of the total capital stock of \$67,275,500, \$66,960,300 has been deposited under the plan of readjustment of Feb. 8, 1899. Holders who have not yet deposited may yet do so prior to Oct. 4, with a payment of \$5 per share penalty in addition to the assessment of \$2 per share. (April 21, p. 291.)

CHATHAM & LEBANON VALLEY.—This company was incorporated in New York State, Sept. 23, with a capital stock of \$1,000,000, as successor to the Lebanon Springs, sold at public auction August 12. The incorporators are: Francis R. Palmer, Russell Sage, Thos. L. James, Geo. M. Hard, Turner A. Beall, Frank S. Black, Walter W. Hastings, Robbins B. Smith, Wm. C. Roberts, all of New York City; Louis F. Payn, Chatham, N. Y.; Simon W. Rosendale, Albany. (Aug. 25, p. 604.)

CHICAGO, PEORIA & ST. LOUIS.—Judge Allen, in the United States Circuit Court at Chicago, on Sept.

20, entered a foreclosure decree for this road and the St. Louis, Chicago & St. Paul under their first mortgages. The sales will probably occur in November. (April 21, p. 291.)

CHOCTAW, OKLAHOMA & GULF.—Holders of prior lien 6 per cent. bonds will receive \$1,050 per bond on and after Oct. 2. They may be exchanged for general mortgage bonds at 106 and accrued interest. (Feb. 10, p. 111.)

DULUTH, MISSABE & WESTERN.—The Powers-Simpson Co., of Hibbing, Mich., which built this road, is reported to have sold it to Wm. B. Joyce of Chicago. The road was completed the early part of the year and runs from Hibbing west 20 miles to the Prairie River with 13 miles of branches. Geo. A. R. Simpson of Hibbing is President. The Great Northern, which owns the Duluth, Mississippi River & Northern, running through Hibbing, is understood to be back of the purchase. (RR. Construction, Feb. 10, p. 108.)

EUREKA SPRINGS.—Holders of securities who wish to obtain the benefits of the agreement of July 12 are asked to deposit their holdings with the New York Produce Exchange Bank, on or before Sept. 30. The committee consists of Richard C. Kerens, Charles H. Smith, Stephen B. Elkins, Edward D. Kenna, P. K. Roots and Uriah Herrman. It is proposed to exchange six per cent. bonds on 18½ miles of the old road for five per cent. bonds on a total mileage of 128½ miles. The additional 110 miles is to be built to extend the road to lead mines at Harrison, Ark. (Railroad Construction column, Sept. 8, p. 633.) It is proposed to make an even exchange of the old bonds for the new. The income bonds, of which there are \$500,000 outstanding, are to receive an equal amount of new capital stock at \$25,000 per mile.

GRAND RAPIDS & INDIANA.—The \$893,000 first mortgage 7 per cent. land grant bonds, due Oct. 1, will be bought at maturity by the Pennsylvania RR. Co., in accordance with its agreement with the G. R. & I.

KANSAS CITY, FORT SCOTT & MEMPHIS.—First mortgage 7 per cent. bonds of \$1,000 each, comprising \$2,000 of Fort Scott, Southeastern & Memphis and \$7,000 Short Creek & Joplin, have been drawn for payment at 105 on Sept. 27, upon presentation to the trustees Nathaniel Thayer and Charles Merriam, 50 State St., Boston.

KANSAS CITY, PITTSBURGH & GULF.—The Philadelphia committee, or which Wm. F. Harrity is chairman, announces that a majority of the securities have been deposited and that the plan of August 17 has been declared operative. (August 25, p. 604.)

NORTHEASTERN GEORGIA.—Governor Candler of Georgia has decided to offer this line for sale at a minimum price, according to report, of \$287,000. This line runs from Athens to Lula, Ga., 39.04 miles, which was bought by the State of Georgia under foreclosure April 16, 1895. In December, 1897 the State Legislature authorized the government to sell the line for not less than \$287,000, the present upset price.

PORTLAND, SACO & PORTSMOUTH.—At a special meeting of the stockholders, on Sept. 25, it was voted to approve the sale of this property to the Boston & Maine. It runs from the New Hampshire State line to Portland, Me., 50.76 miles, and has been leased in perpetuity, since its completion, to the B. & M.

QUEBEC CENTRAL.—The Directors announce that a majority of the five per cent. prior lien bonds have been exchanged for the new four per cent. debenture stock. September 29 is the last day for receiving these bonds, after which the cash bonus of three per cent. will be reduced. (June 9, p. 418.)

ST. LOUIS, CHICAGO & ST. PAUL.—See Chicago, Peoria & St. Louis. (March 3, p. 163.)

ST. LOUIS SOUTHWESTERN.—The stockholders of the St. Louis Southwestern of Texas will vote Oct. 6 on a proposition to buy the Tyler Southeastern, a subsidiary line. (June 2, p. 394.)

TALBOTTON.—Judge Butt, at Columbus, Ga., on Sept. 15, refused to grant the petition of T. N. Gibson et al. to grant a Receiver for this line. The case now goes to the Supreme Court. (Aug. 18, p. 590.)

WEST VIRGINIA & PITTSBURGH.—Brown Bros. & Co. have notified holders of Brown, Shipley & Co.'s certificates of deposit for first mortgage 5 per cent. bonds, under the bondholders' agreement of April 1, 1898, that they are prepared to return the bonds now submitted in accordance with the agreement. (March 31, p. 238.)

TRAFFIC.

The health officials of Texas are still maintaining a strict quarantine against yellow fever from New Orleans. Passenger cars from Algiers are not allowed to enter the state.

The Canadian Pacific is moving large quantities of grain from Manitoba to Fort William, on Lake Superior. The company has in this service 1,000 cars which carry 35 tons each.

The Railroad Commissioners of Texas have ordered a reduction in rates on soap in carloads, from Galveston and Houston, to meet a reduction which has been made by the railroads from St. Louis to Texas points.

According to a press despatch from Newport News, the business of the Atlantic Transportation Co., a concern formed a few months ago to carry coal along the Atlantic Coast, and which went into insolvency, has been taken over by the Chesapeake & Ohio Railroad.

The great rush of freight business on lakes Erie and Huron is giving considerable freight to the railroads. Soft coal is being carried westward by rail farther than ever before. The Ann Arbor road is carrying coal from Toledo northward which ordinarily would go by water. The package freight business of the lake vessels at Detroit is so large that they are unable to handle all of it. There are signs that a falling off in the demand for grain for export

is reducing the offerings of grain to boats, and consequently the rate on iron ore from Lake Superior to Ohio ports fell this week from \$2 per ton to \$1.85.

Cost of Handling Grain at New York.

The New York State Commerce Commission took evidence in New York City last week concerning the cost of transferring grain from canal boats to ocean steamships in New York harbor. Mr. Ely Bernays, an exporter who ships 10,000,000 bushels of grain yearly, three-fourths of which goes through New York, testified that the floating elevator service in New York harbor was well worth what it costs, at the present rate of 7.5 mills a bushel. He believes that grain sent through New York is worth 5 mills more a bushel in Europe than that sent from other ports.

Evidence was given tending to show that the International Floating Elevator Company has an inflated capital and makes exorbitant profits, but the elevator people claim that if they were to reduce the rate to 6½ mills a bushel, as is prescribed by the law of the State of New York, they would not be able to pay dividends. They could make a profit in prosperous years, but would run behind in lean years. It appears that the spirit of the law is evaded by making a charge for "transportation" of the floating elevator to the point where it is to be used, in addition to the charge for elevating or transferring the grain from the canal boat into the ocean steamer. The officers of the International Floating Elevator Company say that the rates (6½ mills for elevating and 5 mills for "transportation") were made by the Produce Exchange before the elevator company was organized, and at a time when there was destructive competition among rival elevator firms. These rivals afterwards combined to form the International.

It was claimed that the consolidated company had, by excellent service, acquired for itself such a good name that its certificates of weights and inspections were accepted in Europe; and that it could take its vessels alongside steamers where new or inexperienced men would not be allowed to go, on account of the liability of damage to vessels.

At a subsequent hearing the Commission heard further evidence concerning the business of the elevator company. The earnings of the company for eight years, and the amount of grain handled for the last seven years were given as follows:

	Total Earnings.	To B. W. & W. Co. Merchants.	Rebates.	To Grain
1892.....	\$619,255			
1893.....	497,228	\$11,250	\$46,499	
1894.....	445,517	9,435	74,499	
1895.....	306,443	22,200	45,335	
1896.....	542,831	27,200	58,081	
1897.....	767,049	7,200	92,659	
1898.....	1,123,813	69,746	308,572	
1899.....	908,920	62,622	261,219	

Following is the total amount of grain handled by the company each fiscal year:

	Bushels.
1893.....	43,523,378
1894.....	45,031,525
1895.....	27,098,696
1896.....	49,163,416
1897.....	70,504,379
1898.....	100,318,462
1899.....	87,691,526

The company has paid dividends of 8, 6, 3, 7, 10, 12 and 12 per cent. in the last seven years. The evidence showed that the capital of the company represented large sums for good will and for equipment that has not been used; also that several hundred thousand dollars of bonds were paid off from the earnings.

The stock of the elevator company is held mostly by members of the Produce Exchange, and evidence was given tending to show that these members, being dealers in grain, were thus able, by the aid of the dividends received from the elevator company, to sell grain at lower prices than could be done by grain shippers not interested in the elevators.

Chicago Traffic Matters.

Chicago, Sept. 27, 1899.

A committee of executive officers representing the roads of the Western Freight Association has agreed to recommend to the general conference in St. Louis, Oct. 10, an entire abolition of all forms of free transportation, except passes furnished to employees over their own lines. The committee has been working on this matter four months. A query was sent to every railroad president in the United States, and the executives of 120,000 miles answered saying that they favored the proposition to abolish all passes. It is proposed to have sectional meetings of executive officers in different parts of the United States to take action on this question. The members of the committee are: Vice-President Morton, of the Santa Fe; President Burt, of the Union Pacific; Vice-President Ramsey, of the Wabash; President Earling, of the Milwaukee & St. Paul; Vice-President Johnson, of the Rock Island and Vice-President Harahan, of the Illinois Central.

General Passenger Agent Sebastian, of the Rock Island, has taken decided action toward stopping the secret demoralization that has existed in Chicago-Missouri River passenger rates for the past three or four weeks. He has put in a \$10 one-way rate between Chicago and Kansas City and between Chicago and Omaha to meet "competition" that exists in other forms. The action of this line was immediately duplicated to Kansas City by the Santa Fe and the Alton, and the Omaha rate has been met by all competing roads. During the past ten days, the local scalping market has been flooded with Chicago-Kansas City tickets, that have been selling from \$2 to \$3 off. The Rock Island has refrained from meeting this competition, but has now decided to fight. The reduction is \$2.50.

The Wisconsin and Michigan resort seasons are now closed. General passenger agents of the lines covering the Wisconsin lake regions say that the business during the past three months has broken all records. The lake lines were literally swamped with business. The business to the Mackinac and Charlevoix Districts was very heavy. The great increase in lake passenger business during the past year or two has caused talk of new lines. A line of fine steamers of the "Northwest" and "Northland" type is projected, to run between Chicago and Buffalo.

The provision rate war between the Burlington and the Memphis roads is about to end. The former line has given notice of the cancellation on Oct. 1, of all packing house rate tariffs from Kansas City to the Southeast, and all rates from Omaha to Memphis for points beyond. After Oct. 1, the combination of local rates will apply.